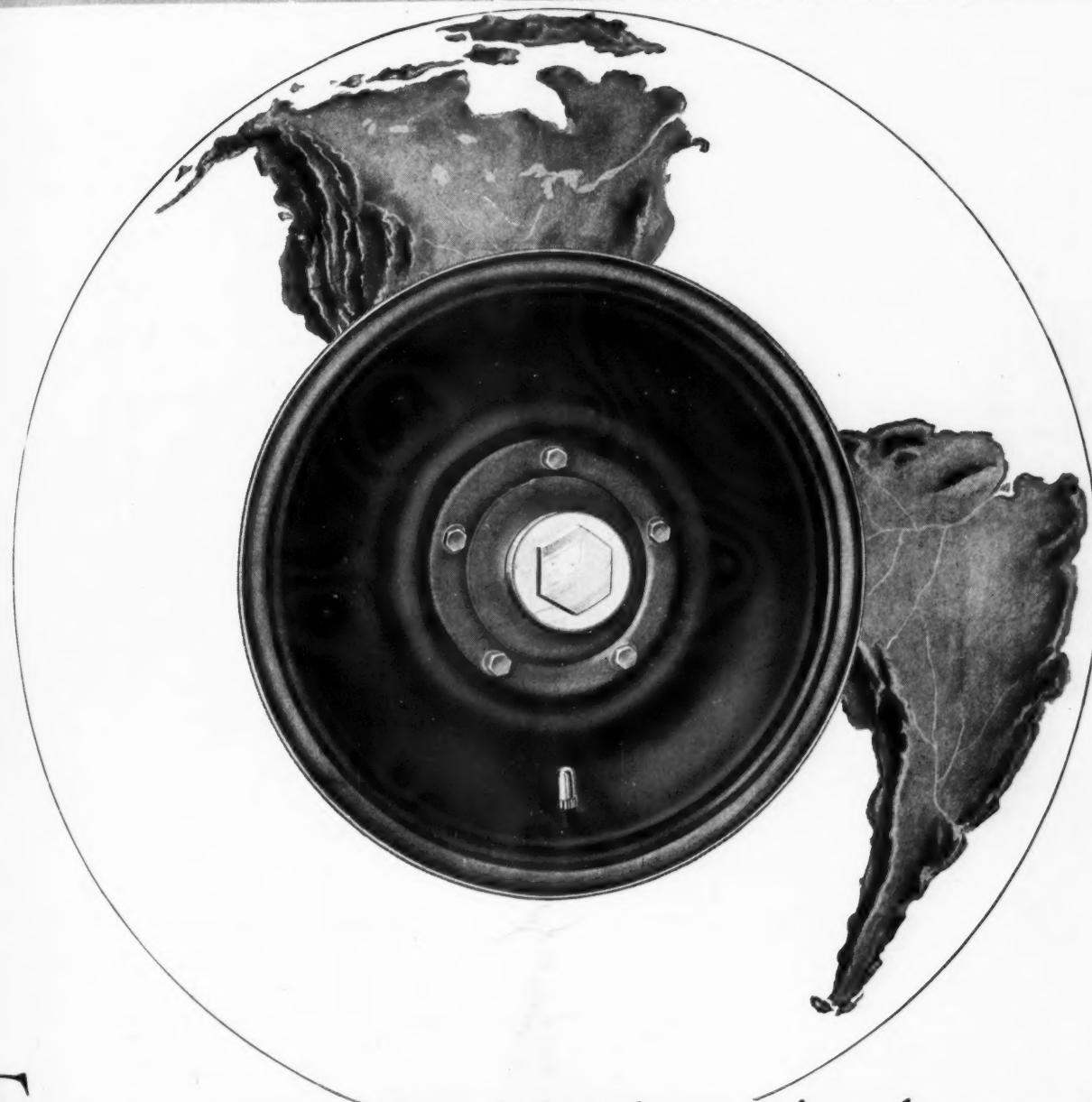


AUTOMOTIVE INDUSTRIES

Vol. 54
Number 16

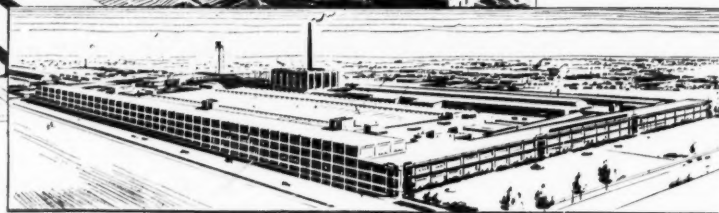
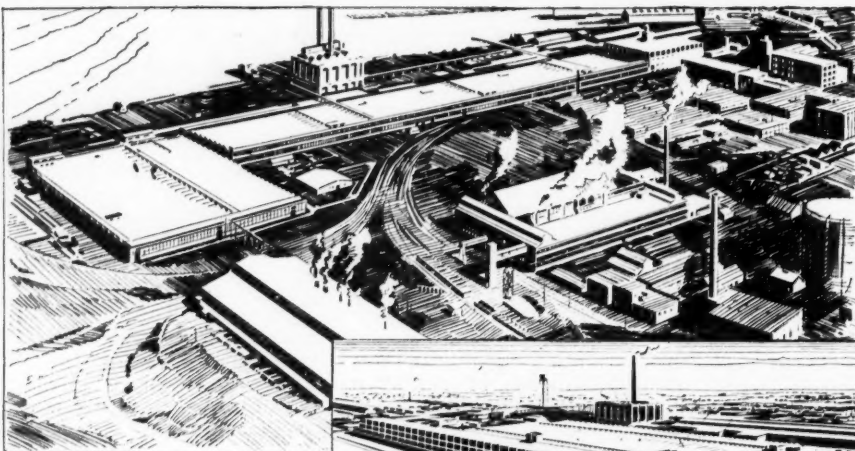
PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, APRIL 22, 1926

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New President Discusses Future Policies of Dodge

Aggressive working out of present program, Wilmer's plan. Won't make radical changes. Keen for economy.

By John C. Gourlie

A YOUNG-LOOKING man, with strikingly dark eyes and hair, a vigorous but genial manner, and a gift of terse and forceful expression—this is Edward G. Wilmer, just made president in active charge of the affairs of Dodge Brothers, Inc. With him, the automobile industry adds to its leaders a man not only of proven ability as a corporation executive but a particularly interesting personality, who is sure to leave the imprint of his character and ideals upon any work he undertakes.

Little is known generally of Mr. Wilmer beyond the superficial facts of his sensational rise to industrial leadership—to a position as head of a two hundred million dollar corporation at the unusually early age of 39. He has been frequently misunderstood and his real principles and policies are quite different from those usually attributed to him.

Old Policies to Prevail

One thing he made plain at the outset of an interview given the writer last week—that no changes in the methods hitherto adhered to by the Dodge organization are planned. Mr. Wilmer contemplates an aggressive working out of policies already established, which means constant attention to the development of the sales organization and a material increase in operating economies without the sacrifice of the quality of the product.

Mr. Wilmer is a great believer in cooperative effort. He would be the last man to conceive of administration as a one-man job. On the contrary, he seeks to get every man in an organization working with him to a common end, and with an uncommon degree of enthusiasm. This object will be pursued throughout the dealer organization—as witness the naming of two dealers as members of the Dodge board of directors.

Mr. Wilmer hails from Milwaukee and is a graduate

E. G.
Wilmer



THIS is an exclusive interview with the new president of Dodge Brothers, Inc., and is the first granted by him for publication since he assumed office last week. He enters the car manufacturing field as head of one of the most important companies, and, being of the younger school of executives, his views, we believe, will be of special interest to readers of *Automotive Industries*.

of George Washington University. He began his career with a legal training, and this perhaps partly explains his readiness of expression, but fundament-

ally it comes from his clarity of thought and his broad knowledge of men and business. He gives unmistakably the impression of going quickly to the heart of a problem and analyzing its difficulties swiftly and surely. One can easily believe that when he arrives at a conclusion he is not likely to be turned lightly away from it, for vacillation and indecision are to him the worst faults of business management.

Mr. Wilmer's first business association was in 1911 with the Schlesinger interests in Milwaukee, where he served as head of the legal department of the Milwaukee Coke and Gas Co. Next he was vice-president of the Newport Mining Co, subsequently occupying a similar position with the Steel & Tube Co. of America, when that company was organized in 1918, through merger of the Newport Mining Co., the Iroquois Steel Co., and the Mark Manufacturing Co.

With Government During War

During the war, Mr. Wilmer was head of the buying section in charge of trench warfare materials and in that capacity supervised the purchase of large quantities of supplies. He went to France in 1918 and after the armistice resumed his work with Steel & Tube, with which company he remained until in 1921 he took over the reorganization of the Goodyear Tire & Rubber Co.

It was in Milwaukee in 1910 that Mr. Wilmer became acquainted with Clarence Dillon and the two have been more or less closely associated ever since, their careers paralleling each other in an upward course, one as business executive and the other as banker.

Probably Mr. Wilmer's most notable industrial accomplishment was the part he played in the rehabilitation of the Goodyear company. In five years, under his leadership, the company was raised from a demoralized condition to one of security and prosperity. In 1925 its gross business totaled \$205,999,829 as against \$170,828,313 in 1920, and net earnings before bond interest and other charges in 1925 were more than \$26,000,000, the largest in its history. In the interval Goodyear securities have shown a market appreciation of approximately \$100,000,000.

One of the most interesting points about Mr. Wilmer's administration of Goodyear, in view of his present position, was the drastic curtailment of production costs. At the peak of production in 1920, Goodyear employed 31,421 men with a maximum output of 35,780 tires and casings daily. In 1925 the company averaged 15,641 employees and with this personnel had a maximum production of 39,517 tires a day and an average production of 33,818.

Mr. Wilmer's comments on this record reveal not only his characteristic viewpoint but give an inkling of what may be expected from his administration of Dodge.

Teamwork at Goodyear

"The Goodyear reorganization has been sometimes referred to as a personal accomplishment of my own," he said. "Nothing could be further from the truth. It represented the best sort of teamwork, an able organization all working together and working well.

"Goodyear's troubles were a consequence of the industrial conditions of the time, and the measures

Older in Experience

EDWARD G. WILMER is one of the youngest men ever elected to the presidency of an important automobile company, being only 39. But in business experience he is older than his years indicate.

He started his career 15 years ago in the legal department of the Milwaukee Coke and Gas Co., after studying law at George Washington University. He soon became vice-president of the Newport Mining Co., and later held a similar position with the Steel & Tube Co. of America.

During his early days in Milwaukee he met Clarence Dillon and the two became fast friends. While Wilmer was hewing a career for himself in the industrial field, Dillon went east to try his luck at selling bonds.

Dillon met with extraordinary success and in a few years was head of the banking house of Dillon, Read & Co. When his firm under-

taken to correct them were merely what were self-evidently necessary.

"At that period the company was burdened with an excess of unstable, shiftless and irresponsible workers. We therefore began at once, being aided by the betterment of labor conditions, to weed out the migratory men and to encourage the men who had a record of steady employment, who had homes near the factory and who, therefore, could be depended upon.

"With fewer men, but with the unreliable ones eliminated, the factory could be operated more efficiently. It was only necessary then to imbue the whole organization with enthusiasm for its task, and the work was done."

"Do you feel that there are operating economies to be effected at Dodge?" I asked him.

Won't Have Product Cheapened

"Certainly," he replied quickly. "The industry is advancing rapidly, new methods are constantly being devised. The limit of economy has not been—perhaps may never be—reached. But whatever is done can and must be done without cheapening the product."

I then sought his views on what policies he considered most vital in successful business administration.

"I know of no yardsticks by which all business can be guided," said Mr. Wilmer. "Each has its particular problems and a thorough study of them is of course the first requirement. When a course of action is determined upon, it ought to be followed wholeheartedly and with a single purpose. Once the necessary groundwork has been accomplished an aggressive rather than a conservative policy should be followed."

The word "aggressive" in its various forms is used frequently by Mr. Wilmer. But an aggressive policy as defined and pursued by him is something quite

Than He is in Years

took the refinancing of the Goodyear Tire & Rubber Co., Wilmer was the man that Dillon selected for the job of reorganizing and rehabilitating the company's affairs.

Wilmer's achievement as chairman of the board of Goodyear stamped him as one of marked executive ability and his name was mentioned prominently in connection with Dodge Brothers, Inc., from the time Dillon gained control, about a year ago. It was taken for granted that sooner or later he would play an important part in the company's management, which proved to be the case when he became, first, a director, then chairman of the board, and finally president.

He believes that to be successful one should be aggressive, but his definition of aggressiveness in the accompanying article gives the term a meaning different from that which it usually is supposed to convey.

different from what might be expected.

"This does not mean," he explained, "rushing headlong in and introducing radical new policies and discharging and replacing men offhand. We discharged many men at Goodyear, but never without good cause. I conceive of an aggressive policy as being sure of your market, sure of your product and sure of your organization.

"When everyone becomes imbued with this spirit it is possible to go forward confidently and sweep aside obstacles. Energy, confidence and enthusiasm, instilled in a business firmly established on a sound basis, are the great factors in real success.

"This must not be taken as a criticism of the previous management of Dodge Brothers. The company has always been capably managed and we are heartily in accord with the policies established. But the administration has been conservative rather than aggressive."

A Democratic Person

Placing, as he does, the utmost reliance upon the personal factor in industry, and having made his belief in men the cornerstone of success, it is natural to find Mr. Wilmer a kindly and sympathetic person, who refuses to surround himself with the trappings of power. There are no formidable obstacles placed in the way of an audience with him.

Despite the staggering burden of matters requiring his attention immediately upon his assumption of new duties in connection with the active management of Dodge, Mr. Wilmer is meeting everyone within and without the organization who has a legitimate reason for talking with him. His friendliness and modesty are already winning the confidence of his staff and he gives every indication of duplicating his achievement at Goodyear, where he won many friends and well-wishers.

In view of Mr. Wilmer's emphasis on personnel re-

lations I asked him what he thought of bonuses and other ideas intended to promote efficiency.

"Bonuses have their value at times of unusual pressure," he said. "But if used regularly I think they tend to become automatic and lose any special incentive. The same is true of profit-sharing plans. However, I am not arguing against them; I simply think that it is more essential to gain the real support of the workman by making him feel he is a member of a team out to win. All the men in an organization are responsive to properly applied enthusiasm."

Change Planned Months Ago

It is now an open secret that the changes in Dodge direction made last week were in accordance with plans made several months ago. In his position as chairman of the board of Goodyear it was impossible for Mr. Wilmer to give complete and active attention to the affairs of Dodge Brothers. But as chairman of the Dodge board he gave as much of his time as his multiple activities would permit. His plans and ideas had already made considerable headway before the change in position was made and his decision to take up residence in Detroit and devote all his energies to Dodge affairs was taken.

In view of the influence over Dodge policies now known to have been exercised by Mr. Wilmer since the purchase of the company a year ago by Dillon, Read & Co., it is worth considering the progress that has been made.

In that period Dodge production capacity was virtually doubled through a program of building expansion that has cost close to \$10,000,000. Models were improved and prices were drastically cut. Sales and production figures show clearly a gratifying public response to the changes.

In the period from Jan. 2 to April 3, 1926, the retail sales of Dodge and Graham vehicles established a record with a total of 70,599 units against 51,318, a gain of 19,281, or 37 per cent over the same period in 1925. Graham sales were 6085 units, a gain of 2704. Shipments from the factory in the first three calendar months of 1926 likewise established a new high mark with a total of 86,351 units as compared with 59,378, a gain of 26,975 or 45 per cent over the same period in 1925. Late in March retail sales began to run ahead of shipments.

With the complete consolidation of Graham Brothers with Dodge the company is in better position than ever to operate effectively as a complete unit in the purchase of materials, manufacturing, supervision, selling and shipping. So long as the Graham brothers maintained their holdings in the stock of the company bearing their name they naturally had a close concern with the affairs of Dodge Brothers, Inc. Under the present arrangement the same incentive is not present, and this doubtless influenced their desire to step out of active participation.

The fortunes of the brothers obviously place them in a position where business affairs need not concern them, and they have signified their desire to take a rest. They have stated that they left the Dodge organization entirely of their own volition and with the friendliest feeling toward the new administration, a statement in which Mr. Wilmer heartily concurs.

Ajax Rear Axle Design Simplifies Production Methods

All operations on housing and differential carrier performed on relatively few machines. Ten men produce from 150 to 175 units per day. Parts light enough to be moved without tackle.

By Walter L. Carver

COMPACT lines consisting of relatively few standard machines equipped with special fixtures, and about an equal number of simple special machines, perform all of the operations on the rear axle housing and the differential carrier which are the major units of the Ajax rear axle assembly. In line with the small number of machines and the compact dimensions of the department, the number of men employed on these jobs is very small and each man produces two and sometimes three operations.

When it is considered that a gang of not more than 10 men about equally divided between the two parts produce 150-175 units per day, the economy of the lines is obvious. Much of this economy can be attributed to the careful design of these parts. Figs. 1 and 2, which are line drawings of the axle housing and differential carrier respectively, show graphically the simplicity of design of each part. Moreover each part is light enough to permit ready handling by one man without the need of tackle of any kind.

No conveying means are required in either line and parts are passed from floor to floor or from one machine to another by hand.

With the exception of the spring pads, which are finished and welded in place at the axle plant, the entire axle is welded pressed steel construction. This construc-

tion eliminates the cast ends which often necessitate much machining. Malleable iron is the material for the housing and the design is arranged so that all holes are drilled in one plane.

In the first operation on the axle housing, the ends are reamed out to 2 11/16 in. diameter for a depth of 7/8 in. on a Murchey double-end boring machine. As shown in Fig. 3, the tubular ends of the axle are supported in V-type saddles and the flat face of the center portion is clamped down at the center table. Hook clamps which are controlled by a hand wheel at the front of the machine extend up into the inside of the banjo section. Feed of the reamers is by hand through a planetary step-down gear. The feed gear shown at the right of the photograph controls both heads. An individual electric motor drives the machine and is provided with button control so that power is consumed only during the actual working time of the machine.

Upon the completion of this operation, the machine operator carries the housing to an adjacent Sundstrand double-end lathe (Fig. 4) where the flange ends are finish turned and faced. Two of the machines face a narrow aisle, although one of them operated by the man at the Murchey machine handles 150 housings per day. Beginning with this operation the flanged ends are used as locating points for all subsequent operations.

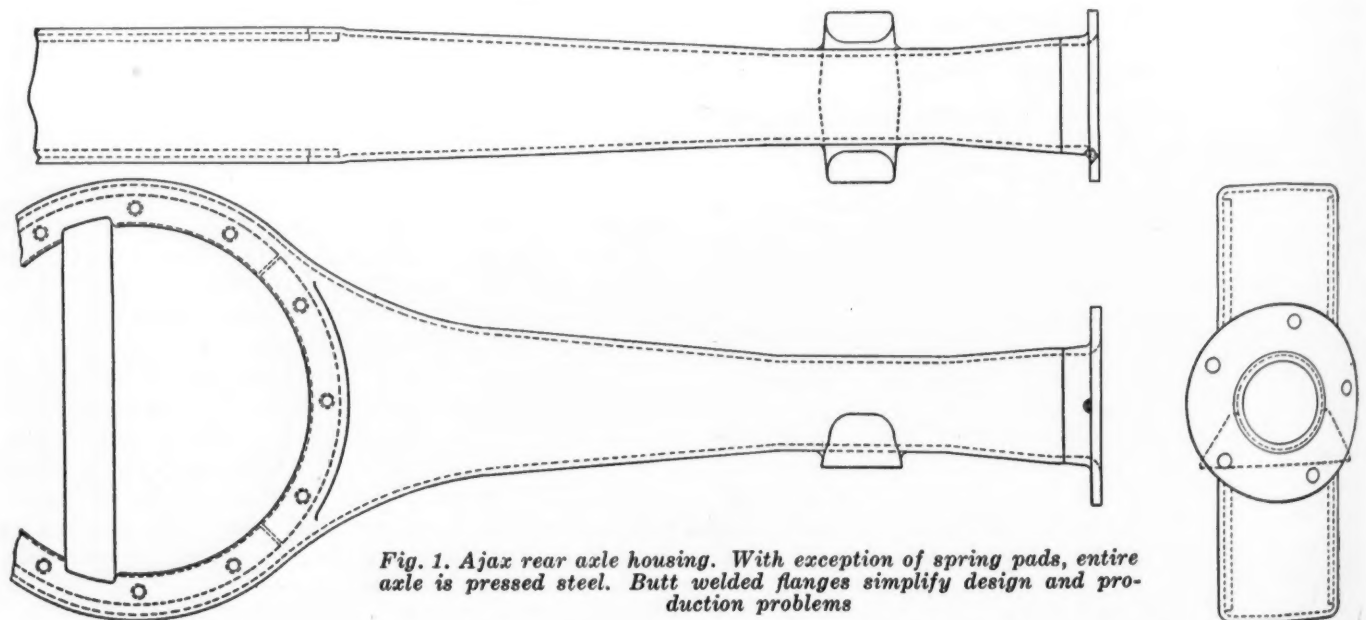


Fig. 1. Ajax rear axle housing. With exception of spring pads, entire axle is pressed steel. Butt welded flanges simplify design and production problems

The axle housing is swung on rotating plug centers which insert in the reamed ends of the last operation. A driving head close to the left rotating center is fitted with an equalizing clamp which grips the housing at the spring pad to secure rotation. A pair of tool heads on the front of the machine turn the flanges to dimensions while another pair on slides at the rear of the machine are facing the ends.

In the third operation the forward face of the banjo housing is cleaned up in a Baker drill which is equipped with a special head carrying a turning tool. As shown at the left of Fig. 5, the housing is held in counterbored ends which are controlled by hand levers. When the counterbored ends are moved inwardly to lock the axle, they are clamped by the hand crank shown. The center portion of the housing is supported by two wedge blocks which are hand actuated and locked by thumb screws. These wedge blocks are fitted with loose hand grips having appreciable weight and a slight endwise freedom. This arrangement allows them to be set up tight and in turn freed without the use of a babbitt hammer.

The special head is equipped with an internal feed cam and epicyclic gear which produces the correct rate of feed. This feed is from the center outward at a constant rate, differing from the old star feed. When the surface is swept completely the head is raised to allow the removal of the axle, and after a new piece is inserted into the fixture the head is lowered again to secure the proper depth of cut for cleaning up. After this a small lever or plunger at the side of the special head is tripped to return the tool to the inner position.

Single Spindle Drill Press

Following the facing operation, the housing is transferred to a Leland and Gifford single spindle drill press with tapping attachment. As shown at the right of Fig. 5, one end of the axle is held in another counterbored locating ring while the middle portion is carried on a cast bracket and centered approximately by locating pins. In this setting the angular holes for the pressure gun fittings are drilled and tapped in the radius which joins the barrel of the axle and the flange. One end is drilled and then tapped for a $\frac{1}{8}$ in. pipe thread. Then the housing is reversed and the operations are repeated. Quick action ball chucks facilitate the tool changes and short drills about equal to the length of the tap are used.

Two men handle the facing as well as the angle drilling and tapping operations and the flange drilling operations which follow. As illustrated by Fig. 6, an electrically driven Natco double-end drill is used for the fifth operation. The axle is dropped into V saddles for approximate location, after which a sliding clamp at the right end of the axle is drawn up by a lever, roller and slide arrangement. This action inserts the finished flanged ends into counterbored lo-

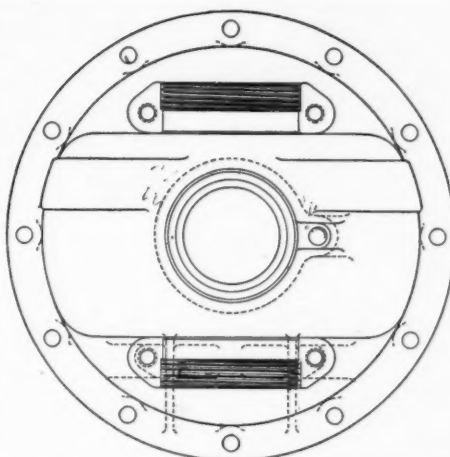
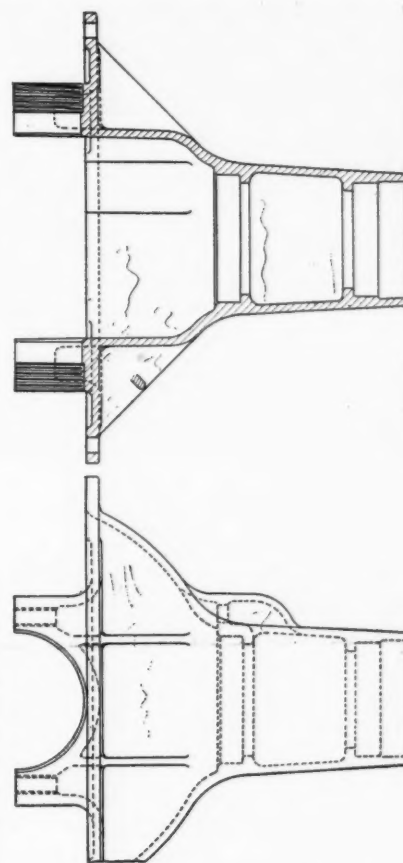


Fig. 2. Malleable cast differential carrier. Simplified design permits ready handling in the shop and reduces number of operations



cating rings. The edges of these counterbored rings are chamfered to permit easy entrance of the flanges. The lever and slide arrangement is self-locking. Here again a taper slide arrangement, screw actuated in this case, supports the central portion of the housing.

Drill bushings are placed in the outer faces of the counterbored supports. While all of the machines in these two lines are electrically driven individually, the double-end drill is simplified greatly by the use of three motors. A motor at each end of the bed drives the five drills and provides the feed for each head. Another motor located on the floor under the bed of the machine drives the coolant pump.

After the flanges are drilled, axle housings are delivered to a pair of Natco multiple drill presses for operations 6 and 8 which are handled by one man who also does operation 7, which is a chamfering job with an air drill. In the first of the Natco drills, 12 holes are drilled in each face of the banjo portion of the housing. In this operation the housing again is located in counterbored carriers at the flanged ends and wedge strips support the center section. The bushing plate is hung from the drill head and is located in alignment with the fixture by pilot bars at the four corners. After the forward face of the

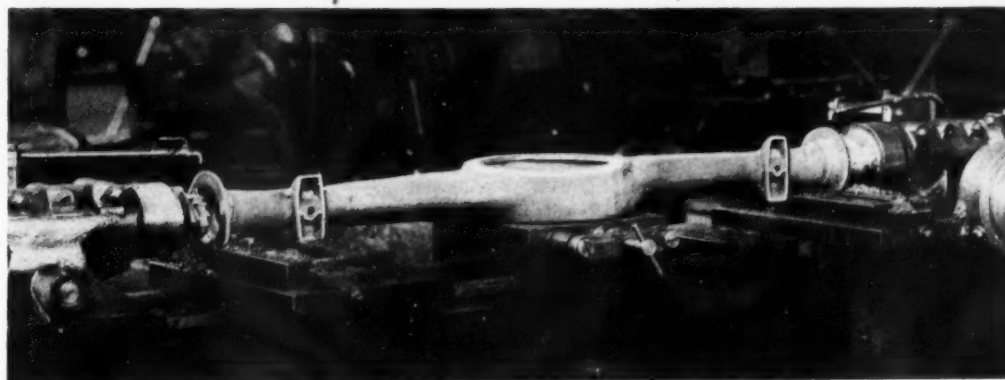


Fig. 3. Reaming both ends of axle in Murchey double end machine. Housing is dropped into saddles at ends and clamped at center

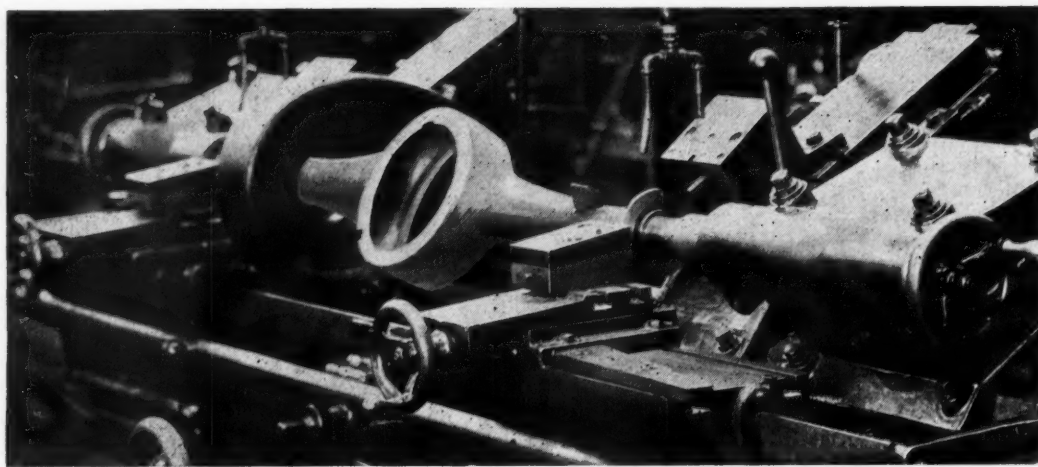


Fig. 4. Reamed ends are mounted on rotating centers for flange turning and facing in Sundstrand double end machine

axle is drilled, the fixture is unlocked and the housing is turned over for the second group of 12 holes.

In operation 7, the operator of these machines utilizes an air drill to chamfer the drilled holes preparatory to the tapping operation. The set up for the last or tapping operation is similar to that of operation C except that the spindles in the Natco drill are set for tapping instead of straight drilling. After this operation is completed the housings are passed through a Blakeslee mechanical washer which also handles several other axle parts. The outlet end of the washer delivers these parts to a transverse axle assembly line.

The differential carrier line is arranged closely parallel to the housing line although the first operation is located near the third operation on the housing. The carrier line extends somewhat beyond the end of the housing line so that a small storage space for both parts is located near the entrance of the Blakeslee washer. Due to this arrangement, an extra man is not required for the operation of the washer as the men near the ends of the line put the parts in the washer at times when they have caught up with the front ends of the line.

Incidentally, these gangs are working under a group plan of payment which stimulates the doing of odd jobs along the line when the work at a particular station is caught up or when trouble has delayed operations at another station.

in addition there is also a finish reamer attached.

Loading and centering are facilitated by a ring which slips over the forward end of the carrier. The periphery of this ring is relieved to form three contact surfaces which pilot into the bore of the spindle of the machine. In this way the forward end of the casting is supported centrally while the three-jawed air chuck is set on the outer periphery of the mounting flange. The operator of these two machines has developed a nice routine of alternating long and short operations on the two machines so that a maximum of unattended cutting time results.

Operation 2 also is done on a Warner and Swasey machine, in this case a No. 6 which has no cross slide. As shown by Fig. 7, the carrier is piloted on an extension plug which fits into the finished bore for the rear pinion bearing. The mounting flange rests on two hardened

plugs and the casting is clamped by two dogs which are at right angles to the locating surfaces. The turret carries bars for roughing the front bearing bore and facing also a finish reamer.

Just beyond the headstock end of the lathe for the second operation is placed a Natco multiple spindle drill press in which operations 3, drilling, and 5, tapping, are performed. For both of these operations a track type fixture as illustrated in Fig. 8 is equipped with a roll-over carriage to

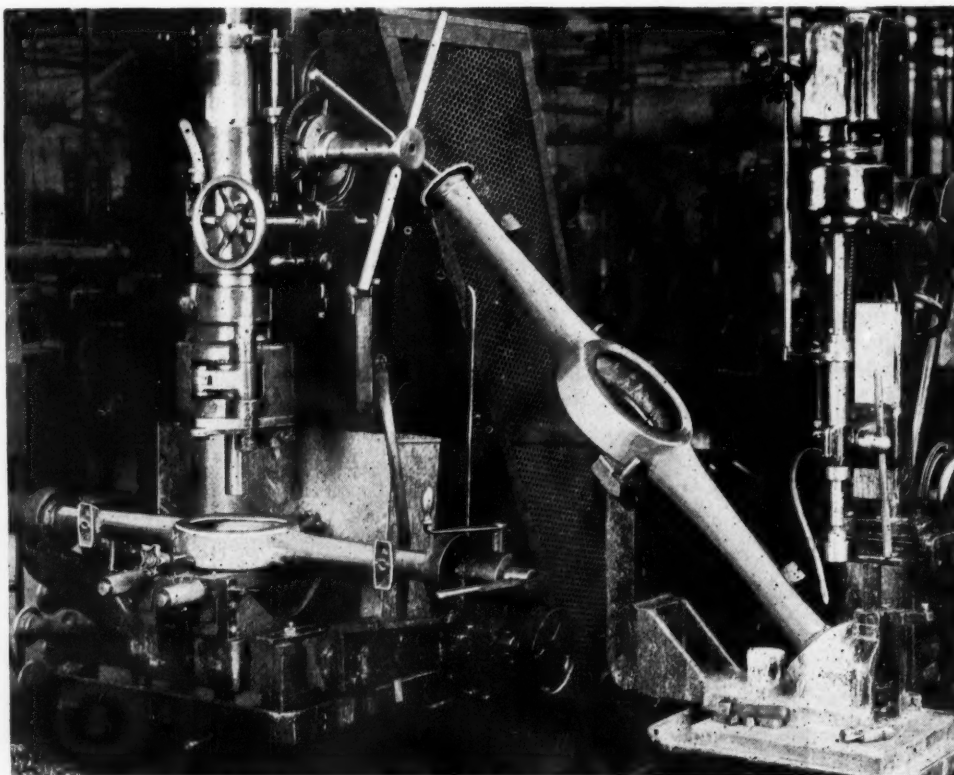


Fig. 5. Facing forward banjo face in Baker drill fitted with constant feed head. At right, set-up for drilling and tapping only angle holes in Leland and Gifford drill press

For the first operation in the carrier line, castings are delivered to two Warner and Swasey No. 3-A turret lathes which have duplicate equipment and are operated by one man. Each machine is equipped with an air chuck. The cross slide carries roughing and finishing tools for finishing the mounting flange and the faces of the differential bearing cap mountings. On the turret are mounted bars for boring the rear pinion bearing, facing and chamfering operations at the opening of the same bearing, and

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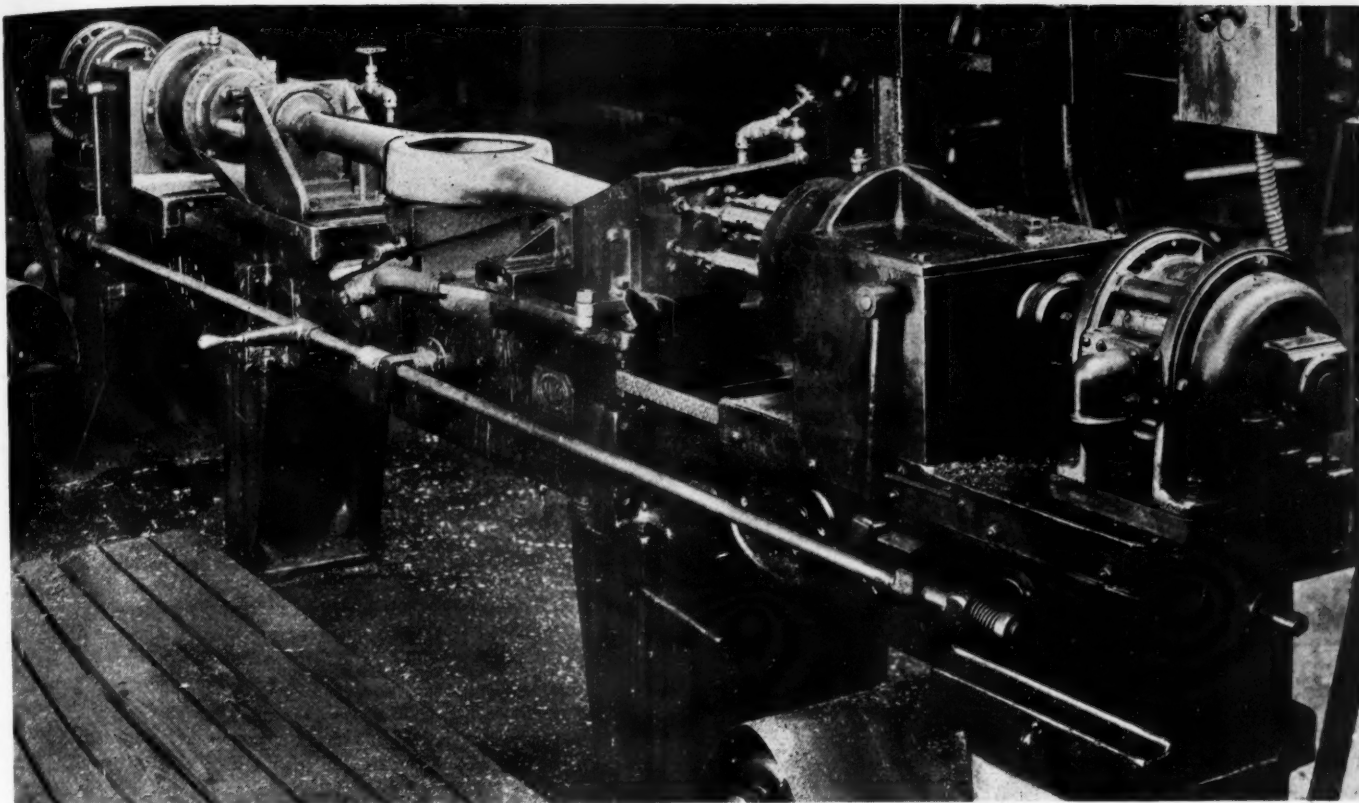


Fig. 6. Three motors operate Natco horizontal drill in which flanges are drilled. Two men operate machines shown in this and previous figure

cilitate loading. In operation 3, the head is fitted with 12 drills for the holes in the mounting flange, four drills for tap drilling the differential bearing bosses and one drill for the oil passage hole which communicates with the space between the front and rear pinion bearings.

Operation 4, which consists of chamfering the edges of the holes on the back of the mounting flange and the four holes to be tapped, is done by the same operator with an air drill. With this equipment the Natco drill is run as a drilling machine for about half of the day. Then the drills are removed, the four middle spindles are shifted and equipped with taps and the same machine taps the holes for the differential bearing cap bolts.

At the conclusion of the tapping operation, the carriers are piled to the left of the machine and immediately adjacent to a small bench where the bearing caps are attached. The caps are face milled and drilled in a short line which feeds to the same bench. Immediately beyond this bench are located two machines in tandem as shown by Fig. 9. In the

first of these two, operation 8, boring the differential bearings, is performed. A Rockford double-end boring machine equipped with oil gear feed finishes both bearings simultaneously. The fixture consists of a heavy cast base in which is set a vertical steel pilot. The base of this pilot fits the rear bearing bore and the upper portion comprises a heavy stud. After the casting is dropped into place and located by a dowel in one of the carrier flange holes, a pilot bushing is slipped over the upper end of the stud and into the forward bearing bore. This bushing is shouldered so that a slotter washer and nut clamp the casting in place.

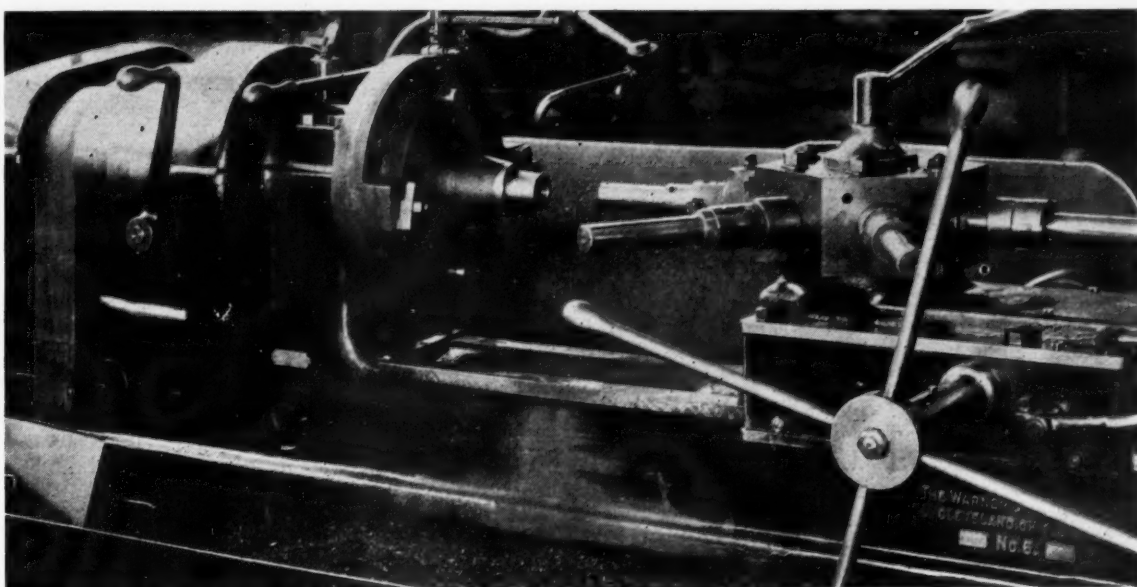


Fig. 7. Warner and Swasey set-up for second operation on differential carriers. Carrier is squared up on pilot and two locating plugs and held by two clamps

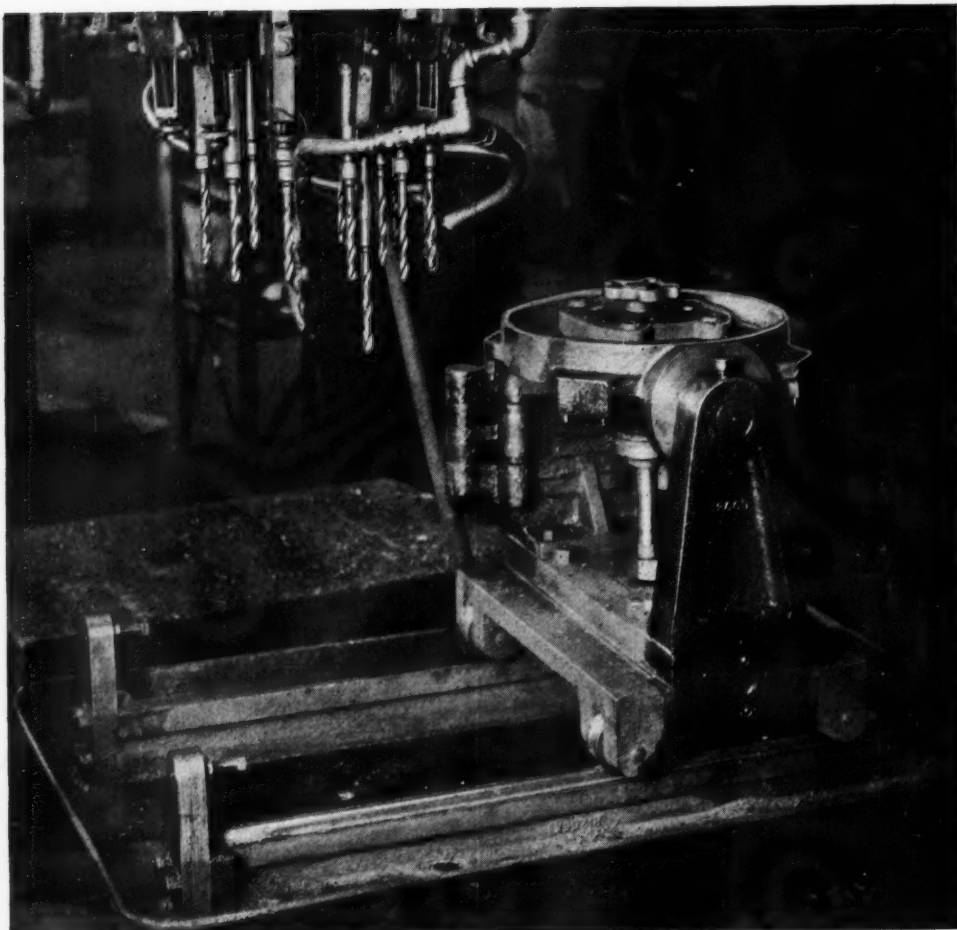
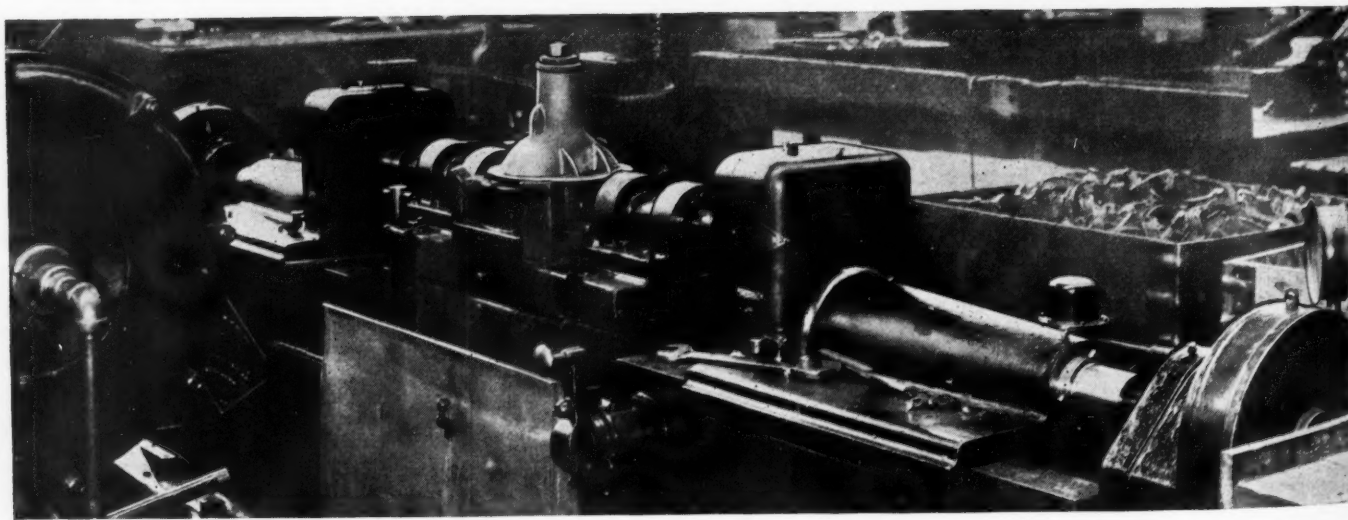


Fig. 8. Roll-over track type carriage used for drilling and tapping operations in Natco drill

The same operator transfers the bored casting across the aisle to a Hall planetary thread miller for operation 8. The drive end of this machine shows at the extreme left of Fig. 9. Here the carrier is mounted on telescopic plugs which project into the differential bearing bores. After the thread in one bearing is milled, the casting is swung around for the same operation in the other. Upon removal from the thread miller, the complete carriers are passed to the entrance of the Blakeslee washer.

Fig. 9. Oil gear drive is used on heads of double-end Rockford boring machine. Carrier is held down by shouldered pilot bushing



Brakes on Stinson Plane

THE Stinson-Detroit airplane, which has been designed by Eddie Stinson, the flier, and which will be put into production during the coming summer, is different in being equipped with brakes of a design similar to those used on motor cars. The object of this equipment is to decrease the amount of space necessary for safe landing since, with brakes, the plane can be stopped within 100 ft., whereas normally it would roll from 600 to 900 ft. before coming to a stop.

Because of the installation of the brakes and the use of a self-starter the plane is actually a one-man plane. The self-starter eliminates the need for a mechanic to turn the propeller by hand and the brakes make wheel

blocks unnecessary. The first time this new plane was demonstrated the ground was covered with snow and ice so that the wheels were equipped with anti-skid chains in order to exhibit the effectiveness of the braking feature. This is probably the first time that non-skid chains have been used on an airplane.

The Stinson-Detroit is an all-metal plane with an electrically heated, four-passenger cab and is powered with a 200 hp. air-cooled Wright Whirlwind motor.

THE Brown & Sharpe Mfg. Co. has just issued a new Small Tool Catalog, No. 30, in which are listed over 2000 tools. New features are numerous illustrations showing tools in actual use, reference tables, helpful hints for mechanics and other valuable information.

Truck Production 12 Per Cent Ahead of Last Year

Output of commercial vehicles thus far indicates record business for 1926. Marked increase in exports.

By Norman G. Shidle

KNEE-DEEP into the second quarter, with three months of good sales behind it, the truck industry seems well on its way toward making 1926 another record year.

If truck output for the whole year maintains the same margin above 1925 as it did in the first quarter, a total of about 557,000 commercial vehicles will be turned out in 1926. It may not be entirely safe to base predictions for the whole year on first quarter results, but it seems almost certain at this time that last year's record production of 497,104 will be surpassed this year, whether the 1926 total gets as high as 557,000 or not.

Reports on truck sales from the retail field tally unusually well with the optimistic view of truck prospects held by manufacturers at the present time. From widely scattered sections come almost uniformly good reports on retail movement of commercial vehicles. Special correspondence just received from Salt Lake City, for example, says "Trucks are going well. Increased demand on seasonal basis expected almost immediately. Heavy crops are likely; these should have a favorable influence on truck sales."

Then from an important Eastern selling territory comes the statement that sales of all types of truck received a strong impetus during the last days of March, with the upward trend continuing during April.

One or two areas in the Southeast have not been providing as strong a truck demand as the retailers

IN addition to a steady growth in the domestic field, American truck and bus manufacturers are pushing toward new sales records in foreign markets. Exports of commercial vehicles during 1926 promise to eclipse those of any previous year.

During January and February the number of trucks and buses shipped abroad represented a gain of 93 per cent as compared to the same months in 1925.

In February, as an indication of how important the export market has become, 20.5 per cent of the total output of commercial vehicles in the United States and Canada was consigned to foreign buyers.

might desire, but even these sections report "fairly satisfactory volume of sales."

Factory executives are practically unanimous in expecting further sales and production gains during the second quarter, although a few of them are hesitant about making too specific predictions concerning the last two quarters.

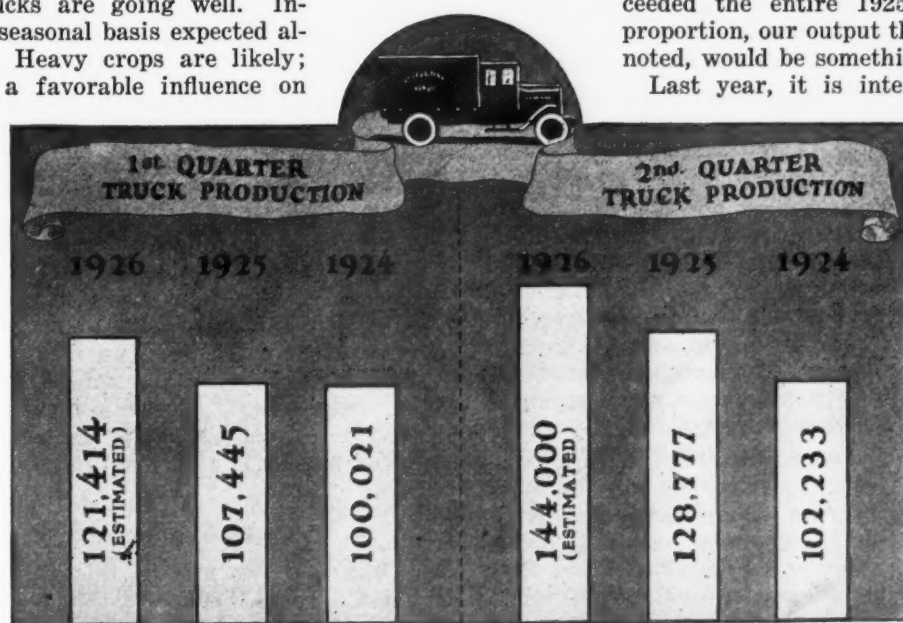
Facts developed from study of the first quarter performance as compared with other years, together with most recent field reports, indicate a reasonably sound basis for optimism.

With March truck production estimated conservatively at just under 48,000, the total output of commercial vehicles in the first three months was 121,414. This compares with 107,445 in the first quarter last year and with 100,021 in the first quarter of 1924.

Stated in percentages, first quarter output in 1926 exceeded first quarter output in 1925 by about 12.7 per cent, or more. If the 1926 twelve months' total exceeded the entire 1925 total by a similar proportion, our output this year, as previously noted, would be something over 557,000.

Last year, it is interesting to note, only

21.6 per cent of the entire year's output was produced in the first quarter. Assuming that the first quarter output this year constitutes a similar proportion of the year's total, the final 1926 figure would mount even higher than 557,000—to about 562,100. Such an assumption cannot be made with too much assurance, how-



Bus production also is included in above figures, which show the trend in commercial vehicle production volume this year as compared to 1924 and 1925

ever, as first quarter production on the average, constitutes a larger percentage of the total for the year than it did in 1925. In 1923, for instance, 26.5 per cent of the year's output was crowded into the first quarter, while compilation of an index, including data of about five years, shows that on the average 24.4 per cent of total output is produced in the first quarter. Total truck and bus production for 1926, estimated on this later basis, would come to only slightly above last year's figure.

There is every reason to believe, however, that 1926 will

ports that "April continues to be good." Moreland Motor Truck Co. is said to have booked orders in the first quarter almost equal to its entire output for 1925.

A. J. Brosseau, president, Mack Trucks, Inc., in a special statement made to *Automotive Industries* in answer to a request for his views of the present outlook in the truck field, says:

"First quarter motor truck and bus production for the whole industry was 12.7 per cent ahead of first quarter last year, although some companies showed a gain of as



turn out to be better than a merely average year for the truck business. Certainly it has started out like a winner.

The first quarter was bigger than any previous first quarter.

The second quarter, now three weeks gone, is showing continued increases.

The farmer, generally speaking, is in better condition than he has been for some years.

General industrial conditions bid fair to remain sound throughout the year, despite the dissipation of inflated values in Wall Street.

No New Troubles Seen

The truck business isn't being beset with any new troubles.

Sound, stabilized truck business with a continuance of reasonable prosperity throughout the last nine months is the obvious result to be expected from this combination of favorable factors.

And that's the way the factory executives are looking at the situation in general. A telegraphic report just received, resulting from a canvass of opinion among leading truck executives in the Detroit district, for example, reads like this:

"Truck and bus executives very optimistic about immediate future of business. Current sales are highly satisfactory. Reports to factories from retail representatives indicate no signs of recession in business. Manufacturers are taking conservative view of situation, however, and hesitate about making forecasts regarding last six months. Most of them seem to expect a well stabilized, reasonably good volume of sales in last two quarters, but are watching general business situation very carefully."

This same indication of conservative optimism is borne out by reports from various specific companies. Graham Bros. sales in the first quarter were so large that by the end of June, this year, this company may have equaled its sales total for the entire year of 1924. Graham Bros. shipments from its four factories up to March 20 totaled 5458 trucks and buses. Among typical reports from the smaller producers, Stewart Motor Corp. in March shipped 51 per cent more vehicles than in March, 1925, and re-

high as 20 per cent. Second quarter should show at least as much of an increase over the second quarter last year. Although we are not making any predictions for the last half of this year, we see no reason to believe that the last six months will not show correspondingly good business from the standpoint of production."

These scattering examples of opinion and achievement in the truck field are merely illustrative of the general trend as it appears today. Similar data from other companies would, for the most part, simply pile up additional evidence along the same lines.

Added to the relatively favorable conditions which exist for continuance of a good truck business in the immediate future in the domestic market is the excellent progress which the commercial vehicle builders are making in the foreign field this year. Export figures for the entire first quarter are not yet available, but statistics on January and February make certain an extremely large gain over the first quarter of 1925. If data for the first two months can be considered as properly indicative of the trend which may be expected for the next few months, overseas sales of trucks and buses will make truly remarkable strides this year.

Total truck exports from United States and Canada increased about 93 per cent in number and about 115 per cent in value for January and February of this year as compared to the same months in 1925. Overseas sales of American commercial vehicles (exclusive of foreign assemblies) were 14,889 in the first two months of 1926 as against 7703 in the first two months last year; and the average price of the units shipped increased from about \$546 to about \$607. The total truck export business from United States and Canada amounted to \$4,206,016 for the first two months of 1925 and to \$9,048,960 for the first two months of 1926.

1380 More Cars Shipped

In the first two months this year, truck makers have shipped abroad 1380 more commercial vehicles than in the first three months of last year.

The immense importance of the foreign market to American truck makers at this time can be visualized

Looks Like He Will Make the Grade!

Truck and bus production has exceeded all previous records during the first three months of 1926 and present conditions in the commercial vehicle market indicate that business will continue good for the balance of the year. Unless the totally unexpected happens, a new production record for a twelve-month period will be established in this branch of the industry.



strikingly by comparison of the February, 1926, production and export figures. In February there were 40,805 trucks built in the United States and Canada. In that same month 8349 trucks were exported from United States and Canada; in other words, 20.5 per cent of the February truck output was sent abroad for sale overseas. While this proportion of exports to production does not hold as an average, it is worth considering as a specific example of the growing value of the export market from a truck and bus standpoint.

If March exports this year held up as well in proportion as did January and February, the first quarter total of exports must have reached approximately 25,000 vehicles.

Should the entire year hold up the promise of the first two months, an export total would be amassed of something like 140,000 trucks as against about 75,000 last year. That would mean a truck and bus export business running to approximately \$84,000,000 this year. That's nearly twice as much as the total wholesale value of all the trucks built in the best year the truck business ever had before the beginning of the World War. In 1914 the total wholesale value of trucks built in this country was \$45,098,464.

Signs Very Encouraging

Commercial vehicle exports may not continue to run ahead of last year by so wide a margin in the last ten months as they did in the first two, of course, and total business may be well below \$84,000,000; but sufficient evidence is already available to indicate clearly that commercial vehicle exports are going to be good.

Distribution of both domestic and foreign sales between vehicles of various tonnages has been pretty much the same as in previous recent years. The advance in production which has been recorded so far has accrued to all types of truck, although there is a very slight tendency for the light and medium sized trucks to do a little better in relation to past performances than the jobs with capacities of 4 tons or more. Bus sales have been satisfactory in most cases and the number of bus lines going into operation continues to grow steadily.

While bus production bids fair to increase in proportion as rapidly as truck production, there was little indication

in the first quarter figures that the rate of bus output advance would be materially greater than that of truck.

The market for both types of vehicle gives every evidence as the second quarter progresses of being well in excess of any previous year, although the statistical estimates made can be considered only as general approximations in any quantitative sense.

Malleable Castings Bulletins

DURING recent years the Department of Commerce has been agitating the adoption by American manufacturers and purchasers of standardized specifications for commodities and the use of certificates by the makers stating that their products do comply with the specification adopted.

The American Malleable Castings Association has been following this practice for several years. Its members supply a product known as Certified Malleable Iron which is, according to the association's definition, the product of those plants who receive a quarterly certificate of merit from the consulting engineer of the American Malleable Castings Association, certifying that their product has met his exacting physical tests and that their plant practice, as shown by rigid inspection, insures the production of uniform malleables of the highest quality and integrity.

Recently the association has been advertising its certification plan through the medium of business papers and has also been carrying on an educational campaign by direct mail. In the latter connection it has prepared a series of bulletins, each describing some feature of the work of the association or the product of its members.

Bulletins 50, 51, 52 and 53, the first four to be published, comment upon the tests to which the products are subjected, tensile strength and elongation of malleables, the research work being conducted by the association, and the fallacy that the valuable properties of malleables are confined to their surface. Copies of these bulletins may be had upon application to the Association Union Trust Building, Cleveland.

Is Cuba a Neglected Equipment Market?

Salesmen complain that business isn't fully developed because of lack of interest on part of U. S. manufacturers.

By P. A. Karl

Export Manager, Brunner Mfg. Co.

A SALESMAN in Cuba cabled his firm in America an order for a motor-driven garage unit, stating in his cable the desired frequency, voltage and phases of the motor. He had closed the sale after a good deal of effort and was pleased with his success.

Two weeks later in Havana he received a cable from his house that gave him a jolt. It asked for motor specifications so that his order might be completed, "without delay."

I cite this as an example of what seems to be a too typical experience of quite a few Cuban representatives of American automotive equipment manufacturers. The salesmen complain that the manufacturers appear to lack interest in the Cuban market.

"Business isn't any too brisk down here," the salesmen tell you. "Sugar prices are low and consequently the country isn't as prosperous as it might be. Still there is profitable business to be got if the manufacturers are sufficiently interested."

One representative of a group of prominent American automotive equipment manufacturers, a man who is well informed as to Cuban business conditions, told me he was confident he could double his sales if he were given adequate support by his principals.

Not Interested in Complaints

Another salesman who had sold many sizable orders of a car accessory found that for some reason the product did not give satisfactory service and brought many complaints from the Cuban importers. Fearing that the future market for this product might be influenced unfavorably, the representative wrote his factory full details, expecting, of course, to receive in reply a helpful letter of explanation or an offer of adjustment. He received instead a note saying that the factory was not interested in correspondence offering complaints.

I left Cuba with the conviction that some of our exporting automotive equipment manufacturers are not sincerely enough interested in the constructive development of their export markets.

Cuba is too important a market to be neglected. Business at present is poor but what there is ought to be handled carefully. The depression won't last forever. The Cubans now are not entirely broke. The narrow streets in Havana are choked with traffic, many new cars are in evidence, the sugar mills must renew or repair their equipment and steamers are bringing in plenty of new merchandise. The Cubans are buying, but not so readily or in such large quantities as they did when conditions were more prosperous.

IN this article manufacturers of automotive equipment are accused of neglecting their opportunities in the Cuban market—Cuba, "Pearl of the Antilles," with the area of Pennsylvania and the population of New Jersey.

The author thinks more American automotive equipment could be sold there if the manufacturers gave their representatives better cooperation and support.

Cuba, incidentally, is our sixth best customer in the export field. Her purchases from the United States in 1924 amounted to \$206,662,049.

Some manufacturers are favored with aggressive distributors who get business and forget conditions. One car distributor told me that business was excellent. The number of his cars to be seen on the streets testifies that this is so. Most of the other dealers find business poor and complicated with the problems of the used cars.

Whatever present conditions may be, Cuba has in prospect a very large market for cars and automotive equipment. The sugar problem does not defy solution, though awkward to deal with. A stay of several weeks in Cuba convinces me that the Cubans have a thorough understanding of their problems. Various plans are now offered to correct the evils due to the economic dominance of sugar. American bankers are studying the possibilities of a valorization plan, similar to the one Brazil adapted for coffee. Some recommend Cuban refineries in export markets that now buy Cuban sugar from the refineries in the States. Others are advocating crop diversification. This seems to be a logical step as Cuba now imports millions of eggs, thousands of tons of potatoes and huge variety of other food stuffs. Her shops are filled with imported canned goods, coming mainly from the States. All this imported food must be paid with sugar—at present with low-price sugar. This cannot continue, because Cuba, with her splendid climate and rich soil, is able to produce these or better foods at a lower cost.

Cuba's wealth will be increased greatly by the influx of tourists who have flocked to Havana this year in greater numbers.

The best assurance for the immediate future business is the character of the present Government. This Government is vitally interested in better roads and has adopted a far-reaching program known as the Cespedes Public Works Act. So far the money available does not permit more than repairs. Funds are being accumulated to start new highway construction, though some believe that the act must be modified before this work will start. The Government, however, will undoubtedly do what is necessary to this end as it has shown itself to be sincerely interested in the construction of better roads.

Like all other markets, Cuba is highly individual and requires special treatment and intelligent effort for maximum results.

Just Among Ourselves

Sounds Like Auto Sales Convention

OFFHAND it would seem as though the problems arising in selling machine tools would be quite different than those arising in the sale of automobiles. As a matter of fact, they are different in most ways. But it seems that there are points of similarity. We just learned for instance that among the topics suggested for open discussion at the coming convention of the National Machine Tool Builders' Association are these three: "Reconditioning and Resale of Old Machines"; "Deferred Payments on Machine Tools"; "Standard Practice for Servicing Machine Tools." Those topics have a familiar ring to the student of automotive marketing. Despite the age of the machine tool industry as compared to the automobile business, however, it is interesting to note that these problems, as major considerations, appear to have affected the older industry later than the younger one, particularly the second item mentioned. That so old and conservative and sound a group as the machine tool builders should even consider instalment selling seriously, indicates that the deferred payment as a marketing tool is no longer among the mere social climbers.

* * *

Under-inflation and Balloon Tire Wear

EXPERIMENTS have shown that with balloon tires it is more necessary than with high pressure cord tires to maintain the inflation pressure at the proper point, if it is desired to obtain a satisfactory mileage. The loss in mileage due to under-inflation has been expressed by one manufacturer in the form of miles per pound per square inch, and the figure arrived at is remarkably high. Of course, it must not be understood that the tires have a maximum life when operated

continuously at the inflation pressure recommended by the manufacturer. The life goes up with the pressure and would continue to go up if higher pressures than recommended were used, but at the same time that the life goes up the riding

RECEPTION-ROOM MONARCHS

No 1—"His Royal Highness"

I AM very important. Therefore I must be very dignified, for is not dignity a necessary attribute of importance? My word is law. My every movement must be slow, calm and studied. No scribbling down a visitor's name and grabbing the telephone to call the man he wants to see so long as I'm presiding at this desk—and that's what I do—preside—I don't just sit here. I preserve my dignity. Carefully in measured movements I reach for my pen and studiously dip it into the inkwell. Then I study the visitor's card for several minutes, just to show him that this job of mine is not something to be taken lightly, no mere routine performance, but a sacred rite to be performed with all the grand pomposity properly associated with important rituals. Finally, I ask how he pronounces his name. "Dinkleman," he tells me. Then I take down the receiver from the telephone hook and ask for Mr. Smith, at the same time fumbling about in my desk drawer for a blotter or a piece of blank paper, for my job is important and my time is valuable. I get Mr. Smith and inform him that Mr. Maneldink is here to see him and when Mr. Smith says "tell him to come right up," I turn to the visitor with a disappointed frown and say "Go right up." For I am older than most of these men who come in here and my inferiority complex demands that I appear just as good as they are and the way to prove that I am, is to keep 'em in their place. And believe me I do it!

comfort decreases while the car becomes less steady and more prone to skid. Somewhere a balance between these different qualities must be struck, and the manufacturers naturally believe that the inflation pressure which they recommend constitutes the best balance. One reason why balloon tires probably suffer more from under-inflation than high pressure tires is that with the former under-inflation is less apparent to the eye. The effect of under-inflation being as serious as it is, operators using balloon tires should be urged not to depend upon the mere appearance or "feel" for guidance as to when they require pumping up, but to use a reliable tire gage.

* * *

Impressions Picked Up in Waiting Rooms

ALMOST everybody has to spend a certain amount of his business life in waiting rooms. Nobody likes to wait. Other things being equal, waiting is a boresome and irritating process. But the man-hours of waiting piled up daily in reception rooms of automotive plants if placed end to end undoubtedly would reach from Times Square in New York to three weeks and nine hours from next Thursday. It always has been that way and probably always will be. That being the case it would seem to be the part of efficiency, good sense, and common courtesy to make waiting as easy and as pleasant as possible. Some factories already do this. Important factory executives can not always tell readily what the conditions are in their own factory reception rooms. We've done some waiting in our time and have found it interesting as well as instructive. This week in the adjoining column is the first of a brief series of mind readings giving our impression of what probably goes on in the heads of some reception room clerks whom we have run into. Maybe you'll recognize some of the types.—N. G. S.

Gears With Longer Teeth Developed for Automobile Use

Said to have better wearing qualities and make less noise than standard involute form. Described at section meeting of S. A. E. at Philadelphia. Front end drives are discussed.

INFORMATION concerning the development and use of gears with teeth longer than the standard involute form for the purpose of increasing their life and their silence in operation featured the meeting of the S. A. E. Pennsylvania Section in Philadelphia on April 13. The subject of the meeting was Front End Drives, and papers were presented on all-steel gears, non-metallic gears and silent chain drives.

R. S. Drummond, vice-president of the Gear Grinding Machine Co., told of the development of a type of gear for automotive use, not only in front end drives but for transmissions and other service, which has a much longer life than gears with either stub teeth or those of regular involute form.

These new type gears are the opposite of stub gears. For example, he displayed an 8-6 pitch gear in which the diametral pitch is 8 while the addendum and dedendum circles are those of a standard 6-pitch gear. Thus increasing the length of the teeth provides considerably more wearing surface and there is greater contact between a gear and its mating surface. Mr. Drummond said that with the long tooth gears one tooth is always in full contact with its mating part while the preceding tooth is entering into engagement and the following tooth is leaving. This prevents a sudden shifting of stress from one tooth to another and makes for very silent operation.

Examination of sudden stresses in the teeth also is a considerable factor in increasing the life of the gears and Mr. Drummond believes that under ordinary conditions long toothed gears will last several times as long as gears with stub or regular involute teeth.

Lengthening of teeth has been carried out so far as to make gears for transmissions having teeth of 16-pitch and 12 length. A set of such gears which had been run 10,000 miles were exhibited and their appearance bore out Mr. Drummond's statement that wear had been inappreciable.

Case Hardened Nickel Steel

Case hardened nickel steel provides the best material for automotive gears, Mr. Drummond believes, and he had found that increasing the nickel content from 3.5 per cent to 5 per cent would double or triple the life of the gears.

The most pressing problem at present in front end drives is to be found in trucks and buses where silence is not such an important factor as durability. Mr. Drummond stated that he had had bus operators tell him that they would be glad to replace their front end drives at the end of every 15,000 miles of operation if they could find a drive which would last that long, but present available drives seldom are good for much more than 5,000 miles.

The constant stopping and starting under heavy load conditions, which is usually a part of bus operation and, to a lesser extent, of truck operation, is very hard on the front end drives. Mr. Drummond believes that case hardened nickel steel gears of the long tooth type will provide much better service than any kind now being used. This is particularly true of large engines, because the additional length of tooth permits greater variation in center distances because of expansion under heat. As an idea of what allowance might be made for this condition, Mr. Drummond said that if the condition was considered when designing the gear train there should be no difficulty in providing a front end drive in which there might be a variation in center distances of .006 in. without causing trouble.

Measuring Methods Weak

A point brought out in the discussion by B. B. Bachman of the Autocar Co., and which was emphasized by Mr. Drummond, was the great need for simple and accurate means of measuring gears in production. It was the opinion of both that inaccuracies in gears were a constant and important source of trouble and that they would continue until better and quicker methods of measurement than are now available were provided.

F. M. Hawley, engineer of the Morse Chain Co., offered the opinion that one of the most prevalent sources of trouble with silent chain drives and one which has received relatively little attention in the past is the corrosion of the links and pins by moisture condensed in the crankcase. He said that constant and ample lubrication under pressure was necessary in order to guard against this condition which attacks the pins connecting the links and frequently causes failure.

The maximum speed at which a silent chain can be driven without developing excessive noise or wear is about 3600 ft. per min., Mr. Hawley said. The method of adjustment for tightening the chain is of considerable importance since the large number of wearing surfaces results in a considerable increase in length even with very small individual link wear. The maximum wear per link is about 0.020 in. for a chain of 1/2 in. pitch, which, in a 63 link chain, would result in a maximum increase in length of 1.26 in.

The average life of a silent chain front end drive used under normal operating conditions is 30,000 to 50,000 miles, according to Mr. Hawley. His paper included a brief history of the development of silent chains and descriptions of the various types now on the market.

E. F. Behning, engineer, gear division, Diamond State Fibre Company, presented a paper on the use and manufacture of gears made from compressed laminated phenolic resin condensation products such as Celoron—his own product—Fabroil and similar products. Many

kinds of materials are used for the base, which is impregnated with the phenolic resins, among them being canvas, paper, linen, etc. For automotive gears, canvas is the base generally used.

Sheets of canvas are formed to approximate gear size and are then impregnated with the resins. Enough layers of the impregnated canvas are placed in a mold to form a gear of sufficient thickness and the heat and pressure are applied. This forms a compact mass which is oil and moisture proof, strong, resilient, and easily machined.

When metal cores are desired they are given a rough diamond knurl and are molded in place with the composition material. This forms a very strong bond between the two and Mr. Behning stated that it requires 10,000 lb. pressure on an arbor press to remove the core.

New Composition Gear

Recently a new type of composition gear in which the teeth are of standard thickness but the inside web is only about one-third as thick as the teeth has been developed. The purpose of this form of construction is to provide greater resiliency under load, since the thin web section will undergo considerable deflection without set and thus absorb a large part of the disintegrating forces which formerly were brought to bear upon the teeth alone.

Composition gears were made popular, Mr. Behning stated, by the service stations who had used cars to sell. Many of these cars had such noisy front end drives that they were quite impossible to sell at anywhere near their value, so many service managers placed a composition gear on the end of the crankshaft to eliminate the metal to metal contact which caused the noise.

Mr. Behning believes that impact strength is the best criterion of the service value of these non-metallic gear materials, since tensile or compressive strength tests do not accurately measure the resistance of the gear to the most destructive forces.

Automotive College Courses

IN a talk before the Cleveland Section of the Society of Automotive Engineers, John Younger, Professor of Industrial Engineering of Ohio State University, advised the automotive industry to take a greater interest in the training being given in colleges and universities to the end that the graduates who entered the industry might be better equipped to handle the particular problems with which they would be confronted there.

He made plain the value and the need of university trained men in industry not so much for the specialized knowledge they possess but because in the colleges they have been trained to absorb more knowledge easier and quicker than most persons not so trained. Although he realized that much of the practical training necessary to fit a person for an executive position in industry must come as the result of years of experience, usually in the manufacturing plant itself, he still was strongly of the opinion that the fundamental training given by the colleges is of immense assistance in making this practical knowledge easier and quicker to absorb.

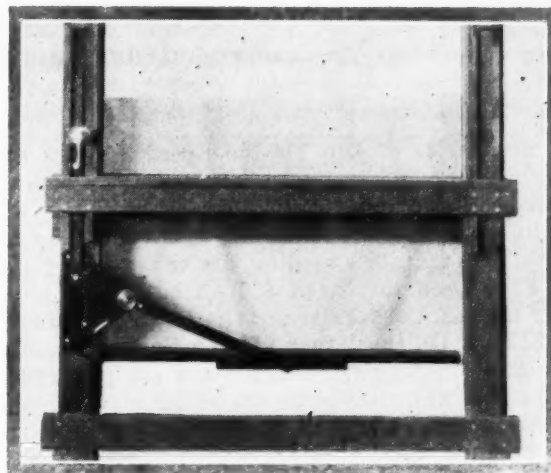
Prof. Younger cited the cases of several companies in the electrical field that have developed definite plans for training their future executives and which reach back into the undergraduate life of various colleges and universities. For example, he said that Bell Telephone, General Electric and Westinghouse train nothing but college graduates for executive positions. These com-

panies first establish intimate contact with the faculty and by quite proper means exert an influence on the courses taught so that the students are molded into a shape best fitted for the purposes of the industries.

The next step taken by the companies is to send representatives to talk to the students just before they graduate. In these talks the companies are described in rather glowing language and the advantages of a connection with them are made plain to the students. The result is that when the student graduates and faces the unknown future he is most likely to follow the line of least resistance and offer his services to these electric companies about which he has been told so much. In this way the electric companies obtain the pick of each year's supply of technical school graduates and these men have, to a considerable extent, been trained along the very lines which will be of most use to them in their future work.

Prof. Younger believes that some such activity should be undertaken by the automotive industry. He suggested that the S. A. E. and, partly the N. A. C. C. should take steps in that direction. The S. A. E. might follow the example of the A. S. M. E. and scrutinize the various automotive courses offered in the colleges and universities and through the contact thus obtained insure that the teachings were in accordance with the best modern practices. The industry might furnish speakers who could give the students a knowledge of automotive affairs outside of their own scholastic courses and would increase their interest in the progress of the industry.

As a start along these lines, Prof. Younger stated that already the first automotive student branch has been established at Ohio State University and that Massachusetts Institute of Technology, Michigan, Purdue and California are expected to follow this action quickly.

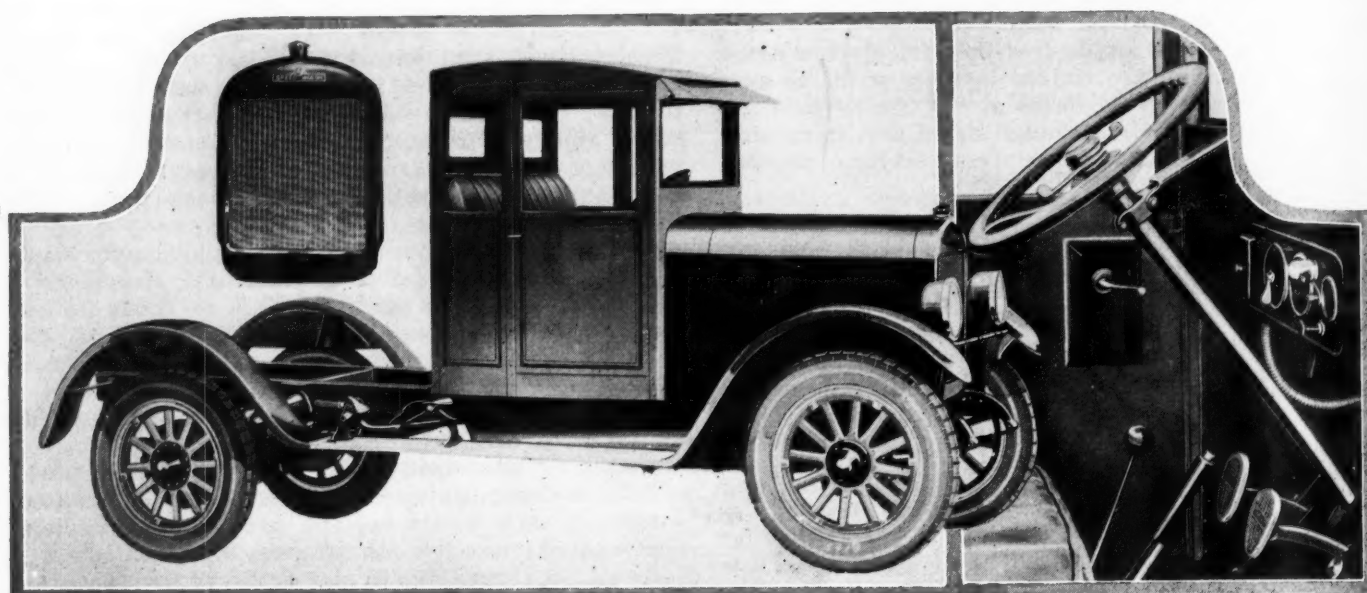


Photograph of new Dura bus window regulating device

Dura Window Regulator

THE accompanying illustration is of a new window regulating device developed by the Dura Company for use on buses. In this new design the operating handle is carried up the pillar where it can not interfere with irregular seat arrangement of the bus if this is desired. As shown in the illustration the window is operated by a long arm which is placed under the center of the load and because of its simplicity and ruggedness the manufacturers expect it to give long and dependable service.

Reo Lowers Body, Improves Steering Gear of 1¼-Ton Truck



The new Reo 1¼-ton Speed Wagon, showing the longer hood, the cowl, the newly designed front fenders and improved cab. ABOVE: The new radiator design. AT RIGHT: Interior of cab, showing the new panel for mounting the instruments and the location of the throttle and spark controls on the steering wheel

Steering made easier by use of intermediate gear in pinion and sector type mechanism. Hood lengthened, radiator changed to enhance appearance. Prices higher.

IN a new series of Reo 1¼-ton Speed Wagons several improvements designed to improve the general appearance, provide greater comfort for the driver, especially with regard to steering, and a lowering in the body height to facilitate loading, are the special features. Prices have been increased \$55 on both four and six-cylinder models, the former now listing at \$1090 and the six at \$1240. On the larger 2½-ton Speed Wagon there have been no mechanical changes and the price remains at \$1985.

As will be seen from the accompanying illustration, the appearance of the lighter Speed Wagon has been enhanced by giving greater length to the hood, the adoption of a cowl, an improved radiator suggestive of passenger car design, redesigned cab and lower bodies, and new type front fenders. The outstanding detail of the new models is the improved steering gear which employs an intermediate gear in a pinion and sector type steering mechanism, the entire unit being enclosed in a grease and dust proof housing.

The main thought in adopting the new gear is to give the driver the same comfort and degree of easy handling as found on passenger cars so that the new models can be driven long distances without fatigue. By use of the intermediate gear in the steering mechanism snapping action of the steering wheel due to road irregularities is practically eliminated.

Additional room in the cab is provided for by making the steering column adjustable so that it can be moved three inches forward at the upper end. The wheel itself is now 18 in. in diameter with the automobile short type spark and throttle controls mounted above the wheel and an unusually large horn button placed in the center.

Fuel Tank Under Seat

In order to get smoother lines in developing the new series it has been necessary to remove the gasoline tank from its former position on the dash and place it under the driver's seat. A compartment to the right of the tank is formed for the battery and the latter is readily accessible by removing one of the divided cushions. The fuel gage of the gasoline tank is located in the space left between the two seat cushions. Removing the entire seat back exposes another compartment wherein a large supply of tools can be carried. With the gasoline tank in the new position fuel is fed to the carburetor by a Stewart vacuum tank bolted on the inside of the dash, and the capacity of the fuel tank has been increased from 11 to 19 gallons.

The cabs are provided with one-piece windshields, sun visors and cowl ventilators. All instruments, including the ignition switch and choke control, are mounted in a neat oak-finish panel on the instrument board. Windows in the doors are operated by crank type handles and the

curtains covering the opening in the rear may be drawn up from inside of the cab. To simplify night driving the Speed Wagons are regularly equipped with the two-filament type of headlight bulbs of the same design as used on the passenger car models.

Lowering the body heights has reduced the energy required in loading and unloading. On the express bodies the wooden sills have been discontinued and reinforcing irons used in their place. These irons extend the full length of the body on each side and connect the outer bottom boards with the body side boards. On the platform and stake bodies the sills have been retained but the cross bunks have been reduced, thus lowering these bodies $2\frac{1}{4}$ in. In line with the general changes, the wheelbase has been increased by 2 in. and is now 130 in.

Low Double-Deck Bus Body

A DOUBLE-DECK bus body of exceptional lowness and so arranged that upper-deck passengers can enjoy open-deck comfort in good weather with full protection in inclement weather, has been designed by A. E. Hutt, Ardmore, Pa., for use in interurban and long distance runs where high speeds are to be maintained.

Mr. Hutt claims that because a double-deck bus costs only a little more than a single-deck job, use of the former permits peak loads to be handled with only about half the equipment investment which would be necessary if single-deckers were used entirely. In addition to this feature, it is possible to upholster the upper-deck seats so that they will be as comfortable as those on the lower deck, since they are fully protected during rainy weather.

In fine weather, Mr. Hutt believes that comfortably upholstered upper-deck seats which are shaded from the sun but are open on both sides will prove an added attraction to the public which will induce it to add bus rides just for the sake of the ride to its rides for business purposes.

The body is so low that when mounted on a chassis of ordinary height the overall height is only 11 ft. In spite of this there is 6 ft. headroom in the lower-deck aisle while the upper-deck aisle is entirely open at the top. Headroom over the seats on both decks is 52 in.

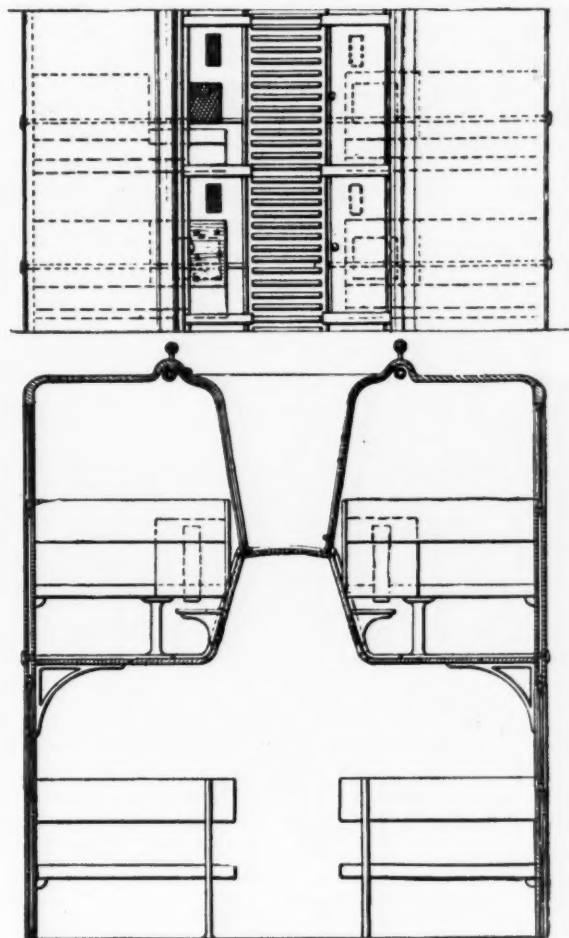
The new design is, in general, similar to that used in the double-deck buses with open upper-deck aisles in Philadelphia, Detroit, Chicago, etc. The main difference between the new design and these other buses is the lowering of the ceiling over the lower-deck seats so as to form a monitor 20 in. deep over the lower-deck aisle.

The upper-deck seats are lowered with their floor so that a saving of 20 in. in the overall height of the bus is achieved. As can be seen in the accompanying illustrations, a light frame work of Haskelite covers the upper-deck seats for part of their width and from the point where this frame stops an open frame work is provided which carries grooves for the individual curtains supplied for each seat, which are easily lowered by the passengers during inclement weather.

Seats are Hinged

The first foot of each upper-deck seat toward the aisle is equipped with a spring hinge so that it is raised like a theatre seat when no weight is on it. This discloses a permanent step underneath the seat. As can be seen from the plan view, this step is not covered by the roof structure so that a passenger stepping down into the seat well is not obliged to duck his head until it is lowered in the natural process of seating himself.

A passenger walking the upper-deck runway has the



Plan view and elevation of Hutt double-deck bus body

roof structure on either side of him at about the same height as the seat backs in usual practice and the roof is provided with a continuous handrail so it is claimed that there will be no danger or fear of falling, even when the bus is operating at high speeds.

The rear entrance of this body is designed for pay-as-you-enter operation and it can be used for one man operation if so desired. All side windows are adjustable and on a fine day with only a little over one foot wide roof structure over each row of upper-deck seats, the windows down and the curtains rolled up, the bus should provide all the advantages of an open top bus with the added advantage that it can be closed during inclement weather.

A TRANSPORT show comprising land, air and water travel, which will be the biggest exhibition of its kind in the world, is contemplated in Paris for 1927, according to Lucien Rosengart, vice-president of the Peugeot Company. "The Grand Palais, situated in the heart of Paris and offering an area of 237,000 sq. ft., is no longer adequate for the French automobile show," he says. "Although on the broadest avenue in the city, traffic congestion around the Palais, while the automobile show is in progress, is enormous and is felt to a radius of nearly one mile. Our intention is to unite automobiles, airplanes and motorboats in one huge exhibition in the Bois de Boulogne, the total area of the show to exceed 1,000,000 sq. ft. A suitable site, with direct means of transportation, within 15 minutes of the heart of the city, is available, and a special hall will be built on it. It is hoped to have this ready for 1927; even if it cannot be completed for this date, it is time now to look for a substitute for the Grand Palais."



Latest model of Lapointe hydraulic broaching machine

New Hydraulic Broaching Machine Provides Wide Range of Cutting Speeds

AN improved variable speed hydraulic broaching machine, No. 3L, has been placed in production by the J. N. Lapointe Co., New London, Conn. A large range of cutting speeds is available, with a fast return of 60 ft. p. m. However, the return speed of the ram can also be varied, between 10 and 180 ft. p. m. A low pressure relief valve is provided at that end of the cylinder into which the oil is forced during the return of the ram, which opens automatically if the ram meets with any undue resistance. This feature eliminates breakage of broaches due to being backed up against the inside of the face plate. The pump producing the pressure on the oil is driven at 900 r. p. m. either directly from an electric motor—a $7\frac{1}{2}$ hp. being recommended—or from a counter-shaft.

Special attention is called to the design of the pressure cylinder. Ports are cored in to eliminate piping and possibility of leakage. Only two pipes are used in the hydraulic system, and these are heavy copper pipes of no great length. The fast return valve is cast separate from the main cylinder, and its ports are made amply large so as to reduce the velocity of the liquid through them. They are machined to remove all core sand.

The cylinder, which is 7 in. in diameter, is cast of hydraulic iron and is mounted on the rear end of the machine bed, being bolted at its forward end to a cross piece cast integral with the bed. At an hydraulic pressure of 1000 lb. p. sq. in., which is the maximum recommended, the pull on the draw rod is 31,400 lb.

Pressure is supplied by an LP-12 Hele-Shaw, variable delivery, multi-plunger, hydraulic pump, manufactured by the American Fluid Motors Co., of Philadelphia. This pump resembles an electric motor of the enclosed type in appearance. It is ball bearing and self-lubricating, and requires no packing.

The stroke of the draw rod is 56 in. and the speed is controllable from 0 to 24 ft. p. m. on the working stroke, with a constant return speed of 60 ft. p. m. Speed

changes can be quickly made while the machine is running or stopped. The control arrangement is mounted on the control shaft running parallel to the cross-head ways and can be locked at any speed required up to the maximum of 24 ft. p. m.

The machine is also provided with an automatic stop for controlling the length of the stroke. This stop is of the spring and plunger type and requires no wrenches for adjustment; if desired, the machine can also be set for automatic return. The ram can be started in any position, on either the cutting or return stroke, by the hand-lever which provides complete control. A linkage connects the operating lever and the control shaft to the pump; the pump is directly connected to an automatic valve arrangement which is integral with the pressure cylinder. This valve is so arranged that during the return stroke of the ram, the oil which produces the pressure on the cutting stroke is transferred from one side of the ram to the opposite side, without going through the pump. On the return stroke, the oil is forced into the hollow draw rod and therefore works against an area corresponding to a $2\frac{1}{8}$ in. dia., which produces the rapid return movement. The reservoir above the pressure cylinder accommodates the excess oil which appears during the working stroke, due to the fact that the ram rod reduces the total volume of the working area on the forward side of the ram. Connections are so arranged that when the relief valves in the pump open under pressure, they exhaust into a reservoir in the base of the machine and the oil is pumped backed up into the reservoir above the pressure cylinder by a small auxiliary pump. The reservoir above the pressure cylinder provides means for filling the system. About 20 gal. of oil are required for filling. The reservoir is filled to the top when the ram is in position to begin the return stroke.

The system at all times is open to atmosphere through the reservoir; this being the highest point, no air can accumulate in it.

Chromium-Plated Automobile Lamps and Fittings Predicted

Although more costly than nickel plating, chromium plating is said to give better protection against corrosion. Great hardness and resistance to wear will bring it into service.

By E. T. Ollard *

Metropolitan-Vickers Electrical Co.

THE two properties that make chromium eminently suitable for plating are its great hardness and its resistance to corrosion. Deposited chromium is considerably harder than deposited nickel, and even hard steel. It also resists the attack of atmospheric corrosion better than any other common metal, except gold and platinum, a property making it very valuable for coating commercial articles, for its price is not prohibitive.

Sulphuric and nitric and most organic acids have no appreciable effect on the metal, but it is rapidly dissolved in hydrochloric acid. This latter property, however, facilitates the easy stripping of a plating, while proving of but little disadvantage in practice, as neutral chlorides, such as sea-water, etc., appear to have no action on it. The melting point of chromium is above 2000 deg. C. and although it oxidizes at a much lower temperature than this, chromium platings can be heated to about 400 deg. C. for a reasonable period without showing noticeable corrosion or discoloration.

There are two main types of solutions that have been worked on, viz., an acidified chromic chloride bath, and a bath chiefly composed of chromic acid but containing various quantities of other chromium compounds.

At first sight, one would consider that an acidified chromic chloride bath, would be likely to prove the more satisfactory for the deposition of chromium, as it would be expected that the chromic chloride under these conditions would dissociate to give a chromium ion, which would be carried over and deposited on a cathode in the ordinary manner. In practice, however, these solutions do not appear to work at all well, and it is very difficult to obtain deposits of chromium from them. Even when deposits are obtained they are usually powdery and un-

CHROMIUM plating is a process that seems to offer important advantages in connection with the finishing of certain automobile parts subjected to considerable wear, such as door and other handles.

Development work in connection with the plating seems to be going on in practically all industrial countries, and it may be recalled that during the past year we described two processes that had been brought forward in this country, in New York and Chicago, respectively.

The present article relates to some research work done in England by one of the large industrial corporations there. Among the applications of the process suggested are the coating of the interior surfaces of metal molds, where the high resistance of chromium to heat and corrosive influences is valuable, and the coating of the valves and their seats in high pressure water pumps, where the hardness of the metal is the valuable feature.

reliable, and, so far, solutions of this type do not appear to have been used on a commercial scale. Further research on this subject, however, might overcome these difficulties.

The chromic acid type of solutions have proved by far the most popular in use, and practically all the processes that are being worked at the moment appear to be of this type. The baths usually consist of a moderately concentrated solution of chromic acid, to which a small proportion of chromium sulphate or sulphuric acid is added. The chromic acid may be partially reduced either by electro-chemical processes or by the addition of chromium carbonate.

A very high current density has to be employed, usually about 200 amps. to the square foot, or more, the voltage of an ordinary sized bath being about 8 to 10.

The cathode gases very freely and the current efficiency is therefore low, about 30 per cent. Lead anodes are usually employed, and although chromium anodes can be used, there appears to be no advantage either in cost or working of the solution. Chromic acid contains about 50 per cent of chromium, and as it is rather less than half the price of the metal there is nothing to be gained from the point of view of cost of using a metallic anode.

Since the chromic acid electrolyzes in the bath to give chromium and oxygen only, and the oxygen is given off at the anode, there is no accumulation of acid or undesirable substances in the bath; therefore it is usually found preferable in practice to make additions of chromic acid to keep the metal content up rather than to use a soluble anode for this purpose, since in the latter case, the anode dissolving with about 100 per cent efficiency while the metal is only deposited on the cathode at about 30 per cent, the solution becomes unstable unless special precautions are taken. During the working of the bath oxygen is generated at the lead anodes, and lead peroxide is often formed on the surface. The attack, however, is

*Excerpts from a paper read before the Electroplaters' and Depositors' Technical Society, London.

not very rapid, and lead plates of reasonable purity and thickness will usually stand up without trouble. Lead chromate will also be formed while the anodes are standing in the solution, but the lead salts do not appear to have any injurious action on the bath.

The cathode gases very freely, the amount of gas that is liberated being fairly considerable, and as this gas usually contains suspended chromic acid, it has undesirable effects on any one with whom it may come in contact, and arrangements must be made for its removal. Also, if a bath of this nature is worked continuously for any length of time, it becomes heated, owing to the high current density. Such solutions do not work well warm, as even greater current has to be used to obtain a deposit and the current efficiency is lower. Cooling arrangements therefore are necessary.

"Throwing Power" Very Low

One of the biggest disadvantages, also, of these solutions is that the "throwing power" is very low. This appears to be due to the cathode efficiency, and also to the fact that below a certain current density chromium will not be deposited. Thus on an object of irregular shape, while the current density may be sufficient to deposit chromium on the prominent parts, on the deeply recessed parts the current will be below this critical value and no metal whatever will be deposited on them.

While all solutions of this type suffer to a greater or less extent from these disadvantages, they can be minimized to some extent, and we have found by comparison of solutions, that the one described by Dr. Liebhafsky in his English patents of 1921 seems to be the most satisfactory in these respects; in this case the chromic acid is reduced to lower oxides before use.

As the active constituent of these baths appears to be chromic acid, it is difficult to see at first how chromium is deposited on the cathode. It might be expected that chromic acid H_2CrO_4 would ionize to give hydrogen ions and chromate ions, and that only hydrogen would be carried to the cathode. It has been suggested that the chromium sulphate usually present in these baths is the important factor, and that this supplies the chromium ions. The chromium sulphate would therefore be electrolyzed to chromium and sulphuric acid and the sulphuric acid combine with the chromium compounds in the solution to regenerate chromium sulphate. While this theory appears possible it does not seem entirely to account for the facts. It is, unfortunately, not possible to discover easily whether a deposit can be made from chromic acid without any sulphate present, as even the purest chromic acid obtainable has always a slight trace of sulphate as an impurity.

An Alternative Theory

An alternative theory is that the deposition of the chromium is not a straightforward matter, but that chromium compounds in a colloidal state are carried to the cathode by the current and that these are then reduced on the surface of the cathode or near it by the nascent hydrogen liberated as a primary product of the electrolysis. The sulphate, therefore, may merely influence semi-subordinate reaction and probably its function is to prevent the formation of basic chromium compounds. This theory appears to fit the conditions better than the previous one, but so far sufficient experimental work has not been performed to verify it or otherwise.

If a bath of the chromic acid type is employed to plate a piece of metal, it will be found that a deposit of reasonable thickness can be obtained in a comparatively short time. Using a fairly high current density, a thickness of 6/1000 in. per hour has been obtained. If a bath similar to the

one described by Sargent [24.5 per cent of CrO_3 and 3 per cent of $Cr_2(SO_4)_3$] is worked at the ordinary room temperature, the deposit will be of a greyish matt appearance. It is, however, possible by suitably altering the conditions and the composition of the solution to obtain deposits which, on being withdrawn from the bath, are quite bright and require no further polishing. This latter process has not been found sufficiently reliable to be used on commercial articles, except in special cases.

The matt deposit described above can be polished comparatively easily on a felt bob or buff, using special polishing compositions, and for most purposes where bright deposits are required it is preferable to deposit the chromium in the ordinary manner and polish it.

Chromium deposits from these baths can be made on copper, brass, steel, nickel, cobalt and most other metals, but so far we have not succeeded in obtaining really satisfactory deposits on aluminum, cadmium or zinc. If the object is cleaned by any of the ordinary methods and the plating conditions are suitably adjusted, the adhesion of the deposit appears to be quite satisfactory.

Many claims have been made that chromium plating will protect iron and steel from rusting. As chromium is usually placed above iron in the electro-chemical series, it might be supposed that it would behave like zinc in protecting the iron from corrosion. This, however, does not appear to be the case, and it is thought that the chromium turns passive and therefore becomes more "noble" than iron. Thin chromium platings made direct on to iron do not give efficient protection, and it is usually found preferable commercially to use some other method, rather than to make a plating sufficiently thick and non-porous for this purpose.

Imperfect Coatings on Iron

If the above theory of passivity is accurate, to get a perfectly protective plating it would be necessary to have an absolutely continuous non-porous deposit entirely over the article. Owing to the bad "throwing power" of chromium, such a deposit on an article of irregular shape would be very difficult to obtain, while chromium platings share the disadvantage of practically all electro-plated metals, viz., that thin coatings are somewhat porous and therefore a fair thickness of metal must be deposited to obtain the required results. Thus, while it may be possible in the laboratory to plate iron test pieces with chromium in such a manner that they will stand all ordinary tests, this method cannot be applied successfully to commercial articles, and no such article plated directly with chromium by any process that has yet been submitted to us has satisfactorily withstood exposure.

For this reason it was decided that in plating iron and steel articles it was desirable to coat the article first with some other metal and then to plate it with chromium. This is analogous to the present practice of coppering steel articles before nickel plating, which is often practised in industrial plating shops for the same reason.

A number of test pieces $2\frac{3}{4}$ in. long cut from a bright steel strip 1 in. wide and $\frac{1}{8}$ in. thick were made. These test pieces had a hole bored in one end for suspension and were then divided into groups of nine. Each group was plated in a different manner with a combination of various metals; three of each group were afterward exposed to atmospheric corrosion on the roof of the chemical laboratory, three placed in a boiler and exposed to the action of the steam, two tested in a salt spray, and one heated in a current of air.

Combinations of nickel, copper, cadmium and chromium were used, the platings being done by a semi-skilled assistant in baths that were being used for various other

plating operations, under the ordinary conditions. The various groups of test pieces were plated in the following manner:

Group 1. One hour deposited in a cadmium cyanide bath.

Group 2. Three hours deposited in a nickel sulphate bath.

Group 3. Half-hour deposited in cadmium cyanide bath and one hour in nickel sulphate bath.

Group 4. One hour in nickel sulphate bath and half-hour in cadmium cyanide bath.

Group 5. One hour in nickel sulphate bath, one hour in copper sulphate bath, then buffed and plated half-hour in nickel sulphate bath.

Group 6. Half-hour in chromium bath.

Group 7. Half-hour in copper cyanide bath followed by half-hour in chromium bath.

Group 8. One hour in cadmium cyanide bath followed by half-hour in chromium bath.

Group 9. One hour in nickel bath followed by half-hour in chromium bath.

Group 10. Half-hour in copper cyanide bath followed by one hour in copper sulphate bath.

Group 11. Two hours in nickel bath followed by half-hour in chromium bath.

The test pieces plated in this manner were then tested as described above. The difficulty of testing pieces of this nature lies in the fact that if the outer plating has been removed from any part, the rate of corrosion is materially changed and usually very much accelerated. Test pieces of this nature show three types of failure. In the first case the coatings are gradually and fairly evenly removed until finally the base metal is exposed, after which corrosion takes place very rapidly; in the second, the plating is originally either pitted or somewhat porous, and corrosion takes place at a few local spots, while in the third case the plating is thrown off from the metal underneath it, either because it does not adhere or because the underlying metal is corroded through the pores of the outer one.

Record Kept of Loss

The test pieces were all measured and weighed before and after the tests, and the loss of weight per unit area was calculated. Notes of the appearance of the test piece were also kept and specimens of one of each of the groups exposed on the roof.

The specimens were hung from a frame on the roof of the laboratory, suspended directly above a trough of water and exposed to the atmosphere. The time allowed for this test was 768 hours, and examinations were made at intervals.

Under these conditions the nickel-plated specimens were readily attacked and showed a greenish deposit on the surface. The cadmium specimen stood fairly well but appeared to be evenly attacked. The copper specimen was very much tarnished and also lost a good deal of weight. In the case of the chromium deposited directly on to steel, the chromium plating was almost entirely removed, having apparently been thrown off by the corrosion of the steel underneath it. The chromium deposits made on copper and steel stood quite satisfactorily with only slight traces of local rusting. In the case of chromium deposited on to cadmium, this specimen stood remarkably well but in some places the chromium flaked away from the cadmium coating. The chromium plating does not appear to adhere well to the cadmium, and, especially in the subsequent tests which involved temperature rise, the chromium plating was almost entirely removed from the cadmium. The most satisfactory specimen from the point of view of loss in weight was that in which the steel was

first copper and then chromium-plated (7) although those with nickel as an underlying metal (9 and 11) also stood very well.

In the boiler test the specimens were suspended in the steam space of a small boiler. This boiler was arranged so that the steam generated by it was passed through a condenser and the water fed back again. Small additions of hydrogen peroxide were made at intervals to keep up the dissolved oxygen content of the water and the conditions generally arranged to correspond to those which would be met with in steam plant.

In this case the chromium with underlying nickel proved the most satisfactory, while the nickel plating stood fairly well. The cadmium protected the steel fairly satisfactorily from rust, but lost weight and would have been removed in time.

Salt Not Very Injurious

As chromium is attacked very violently by hydrochloric acid it was thought that the conditions prevailing in the salt spray test would corrode it very rapidly. This point is rather an important one, as claims have been made that chromium plated material will withstand the action of sea water and this is a big factor in its industrial application. It was found, however, that the salt spray had very much less action on the chromium plating than was anticipated, and it is probable that a definite pH value of the solution is required before the chromium is readily attacked. The pH value of the solution used in the salt spray was about 6.4, being slightly on the acid side (sea-water about 6.6).

The specimens were sprayed for 122 hours of actual spraying, being examined at intervals and allowed to remain in the chamber at night, while the spray was not working. In this test the most satisfactory plating were those consisting of both nickel and cadmium (3 and 4). The chromium plating with nickel and an underlying metal stood quite satisfactorily, losing about the same weight as the nickel-plated specimens and less than the cadmium-plated specimen. The copper-plated specimen (10) was very badly corroded.

One specimen of each group was heated intermittently in an oven at about 400 deg. C. to 420 deg. C. for 150 hours of actual heating. Weights in this case were rather difficult to interpret, as, in some cases, there was a definite gain in weight due to oxidization. In this case, again, the cadmium-plated samples (1) were badly attacked and also the chromium-plated on cadmium (8). In this latter case the chromium was almost entirely thrown off.

The other chromium-plated samples all seemed to stand well, the surface of the plating, however, oxidizing slightly. The nickel-plated specimen (2) also stood well.

Another test piece of steel was made which was plated first with nickel for about an hour, then an hour in the copper sulphate bath, then replated with nickel for half-an-hour, polished and finally chromium-plated for half-an-hour. This specimen was exposed on the roof of the chemical laboratory for about three months and at the end of this time was still quite bright, showing no apparent sign of rusting.

Good Results With Undercoat

The results of the tests indicate that while chromium-plated direct on to steel will not give efficient protection, by using an underlying metal as indicated above, very satisfactory results may be obtained. This has been further borne out by the testing of articles in service as described below.

It is difficult in a laboratory to reproduce conditions similar to those to which plated articles are subjected in practice, especially as laboratory tests usually have to be

very greatly accelerated in order to obtain the required results in a limited time. So a very large number of chromium-plated articles of various natures were distributed among a number of people who would use them in the ordinary way, and report whether they were satisfied with the plating. A number of lamps and other automobile fittings, as well as many domestic articles, were therefore plated for people who could keep them under observation. Many of these have now been in service for six months or more and have been reported on very satisfactorily.

Automobile head lamps, which are usually made of brass, and other brass fittings such as handles, etc., seem to be one of the most important applications for a process of this nature. Nickel-plated lamps, after having been out some hours in damp or foggy weather, will lose all their polish and require cleaning. Not only does this involve a great deal of labor, but the rubbing and action of the cleaning material usually removes the nickel plating after a comparatively short time. Substituting chromium-plated lamps, it was found that these would effectively resist the action of foggy and damp weather, and would show no signs of tarnish after having been used in such weather for several months. All that is required in this case is to remove with a damp cloth any mud or other dirt that settles on the lamp.

In view of the results of the salt spray test mentioned above, it was decided to test some chromium plating with sea water and sea air. For this purpose some steel test pieces plated with nickel and then chromium were exposed on various parts of a boat for about three weeks. One test piece also was suspended overboard every night and pulled up and left to dry during the day-time. In none of these test pieces was the slightest tarnish noticeable and, except for one or two small local spots on the test piece hung overboard there was no rusting or corrosion of the steel.

The Plating of Molds

It seems probable that chromium, owing to the properties mentioned above, may find various important industrial applications. One that has been tried is in the plating of parts of molds for die-casting metal. A mild steel pin going through such a mold was given a moderately thick deposit of chromium and was found to withstand the molten metal better than the previously used alloy steel pin. Experiments were made as to whether it was possible to obtain an alloy of chromium and iron on the surface of a steel article by heat treatment. Heating to 900 deg. C., however, in a reducing atmosphere did not give the desired result and work done in America recently on this subject indicates that such a process will not be commercially possible.

Another important application may lie in the hardness of the deposited chromium. Heavy deposits of this metal can be made comparatively successfully and quickly and it is possible in this way to protect machine parts, etc., which are subjected to heavy wear. A valve face and seating used in a pressure pump which had to deal with water containing fine abrasive particles was successfully treated by this process, and whereas previously valves of the hardest gun metal had worn badly at the end of a week's running, the chromium faced valve has now stood for about two months or more without showing noticeable signs of wear.

In chromium plating cast metal care should be taken that the castings are of the best quality obtainable. Castings containing pores or blow holes are liable to give a good deal of trouble, as not only are these modifications accentuated by the pickling and plating of the articles,

but they tend to occlude small quantities of the very active electrolyte that are very difficult to eliminate by final washing, etc. It is desirable, therefore, that castings to be treated by this process should be as sound as possible and should pores, etc., be present, special precautions must be taken to wash and dry the article before it is allowed to leave the plating shop.

An X-ray examination of deposited chromium reveals the fact that this material is of a different structure from chromium prepared by the ordinary methods. While ordinary chromium is of the body centered cubic modification, deposited chromium consists chiefly of a hexagonal close-packed form, the axial ratio c/a being 1.625 instead of 1.633, the ideal ratio for the close-packing of spheres.

Cost is Not Prohibitive

Many attacks have been leveled against chromium plating on account of the cost of the process, and it has been stated that the cost of chromium plating would be as much as six times that of nickel. To justify these figures the high cost of the plant and solution, the high current consumption, the cost of the metal, or replacement chemicals, the further costs of additional plant, etc., necessary to remove the fumes have been quoted. Undoubtedly a plant for chromium plating will have a high first-cost, as it is necessary to use earthenware vats, a large current consumption necessitating a large converter unit, and fume removal apparatus, etc.

On the other hand, a plant of this nature will pass through a large amount of work per day, as owing to the speed with which the chromium is deposited only a comparatively short time is necessary to get a satisfactory deposit for ordinary purposes. The cost of current is never a very large factor in plating costs, and the amount of chromium plated on to each article is small. The chief costs will be in the labor, and there is not much more labor involved in chromium than in any other plating.

While, therefore, chromium plating will undoubtedly prove more expensive than nickel, it seems probable that the costs will be not more than double instead of six times. Since the plating prices are not usually a very high percentage of the total cost of an article, in a great many cases it would mean only a small per cent increase in price of the finished product, which should be fully justified by its superior performance. Where composite platings of more than one metal have to be dealt with, as in the case of plating steel, it must be pointed out that the wiring up, cleaning, and other preparation processes account for a great deal of the cost of plating, and, except in cases where it was necessary between the operations to polish the article those preliminary processes would only have to be done once.

Polishing Takes Longer

The final polishing of the chromium may take somewhat longer than the corresponding time for nickel, and this may slightly increase the cost, but so far, this does not appear to be a very large item. Accurate figures, however, on the cost of the process cannot possibly be obtained until it has been commercially worked for about a year.

Although many prophecies have been made that chromium plating will entirely replace nickel, this appears most unlikely to occur at present. There is little doubt, however, that chromium plating has come to stay, and it will shortly find its level in the industrial world. It is not too much to expect that in a few years time a large percentage of automobiles will be conspicuous by their chromium-plated lamps and fittings.

Mack Departs from Usual Practice in Gas-Electric Design

Uses single motor drive and retains standard rear axle and differential gear. Two chassis sizes in production, designed for 25 and 29-passenger city-type bodies. G. E. electric units.

INTERNATIONAL Motor Company, as announced in our news columns last week, has bought out a gas-electric bus made up of the standard Mack city-type bus chassis with General Electric electric equipment. This new bus is different from other gas-electrics of American design in that it uses but one electric motor, thus retaining the standard Mack double reduction rear axle and differential gear. At present, production is confined to two sizes of 196 in. and 225 in. wheelbase designed for 25 and 29 passenger city-type bodies respectively.

Additional weight made necessary by the substitution of electrical units for the usual transmission system is 1400 lb., making the total empty weight of the 25-passenger bus 11,300 lb. and that of the larger job 12,130 lb.

The generator—DT-1105—is rated at 125 volts and 200 amp. at 1200 r. p. m. It has triple excitation through a shunt winding, a small series winding connected so that as load increases field strength is automatically kept up and by a small field winding on a separate circuit from the main windings which is fed from the 12-volt starting battery, and is designed to provide small initial excitation so that the generator will respond instantly when the throttle is opened.

The single motor is a G. E.-1101 rated at 125 volts and 140 amp. at 1100 r. p. m. and is of the series type, fan ventilated.

Rubber Shock Insulators

The front end of the generator is bolted to the engine fly-wheel housing, while the rear end is supported on a drop-forged cross member. The engine and the generator are supported as a single unit by five rubber shock insulators to absorb vibration. The motor is mounted on three rubber shock insulators.

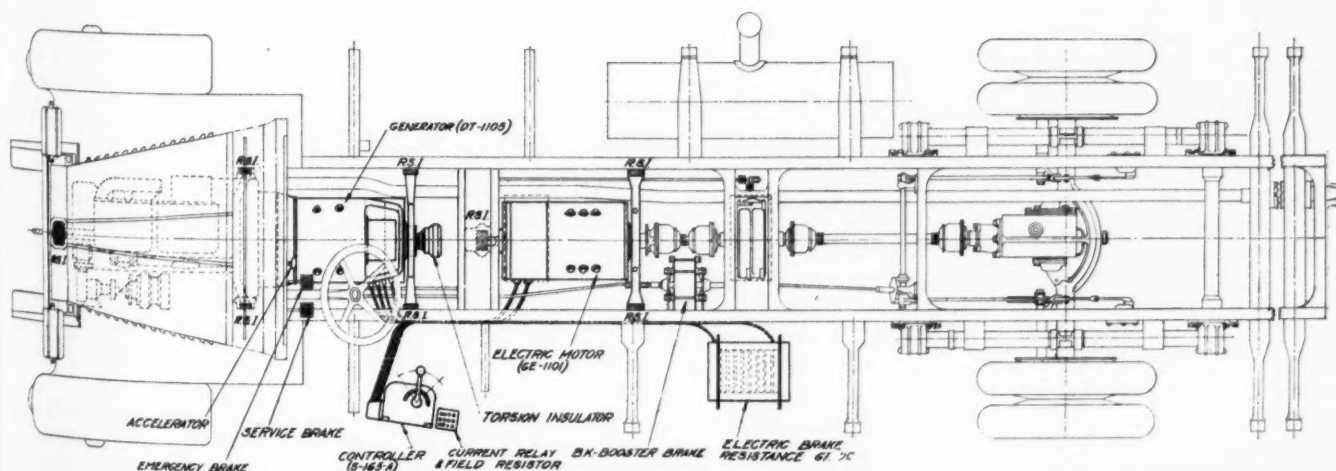
The usual controller for giving proper connections for forward and reverse motion and for emergency braking is used, while ordinary operation of the bus is controlled by the accelerator pedal. Emergency electric braking is provided for on the controller by a position in reverse which, with a limiting grid resistance in series, will hold the speed of the bus to about 10 miles per hour. Further braking effort can be supplied by accelerating the engine while the controller is in the reverse position to bring the vehicle to a full stop. A forward braking position is also provided so that even with the engine stopped and other brakes failing, the bus will not roll backwards down grade at a dangerous speed.

Vacuum Booster Brake

There is no hand brake lever, but the emergency brake, which consists of a drum 11 in. in diameter and 6 in. wide, operating on the propeller shaft, is controlled by the right hand pedal. The service brake on the rear wheels is controlled by the left pedal and the operator's effort is augmented by the application of a Bragg-Kliesrath vacuum booster brake.

The motor of the Mack bus does not protrude above the floor level although the clearance beneath the bus has been maintained at 9½ in., the same as that of the company's mechanical drive jobs.

The engine which furnishes primary power is a standard Mack bus engine of four cylinders with demountable heads cast in pairs and with 4½ in. bore and 5 in. stroke. Horsepower rating is 28.9. Features of design are aluminum alloy pistons; counter-balanced and case hardened crankshaft and timing gears; offset combustion chambers; tubular steel connecting rods, and force feed and splash lubrication.



Plan view of new Mack gas-electric bus

THE FORUM

Advocates Longer Piston Stroke to Increase Thermal Efficiency of Engines

Editor AUTOMOTIVE INDUSTRIES:

It is very gratifying to note the lively interest taken in the thermal efficiency of our present day engines. Most of the contributions of the last three months have centered around the Diesel type engine and its possibilities for transportation. I believe in its future, at least for the larger units; nevertheless it seems to me that before we go to the complications of a Diesel engine, we should improve the fuel economy of the gasoline engine. Mr. Clayden in his letter of March 4, has pointed very clearly to the fact that there is still considerable scope in this direction. We admit, of course, that all designers are striving for more power per cubic inch, which means more power per gallon of gas. But it is rather surprising to notice how little attention is being paid to the best and cheapest way of accomplishing this: We mean the careful consideration of the bore stroke ratio. The predominance of the side valve engine right now is unquestioned, and it is just this type of engine which can be most improved upon by adopting a long stroke. Let us see why.

In the first place, the long stroke engine will have a more compact, almost hemispherical combustion chamber with much reduced surface and short flame travel. All of which makes for an engine capable of running at a higher compression ratio without detonation. The resulting increase in power and the corresponding saving in fuel cannot be over-emphasized. A present day 600 cu. in. 6-cylinder engine of say $4\frac{5}{8}$ bore by 6 in. stroke will have a compression ratio around 1:4.2. If we change bore and stroke to 4 by $7\frac{1}{2}$, we can run up to 1:4.8 with safety. Since the m.e.p. is proportional to the compression pressure, this means a saving in fuel of 14 per cent, which certainly makes a nice sales point!

Quite contrary to a widespread belief, the long stroke engine has much the better acceleration than a "square one" of the same displacement, on account of its lighter reciprocating train, and shows less vibration for the same reason. It can easily be shown that of the two engines referred to the one with the long stroke has 25 per cent less inertia forces. No better illustration of this could be found than the comparison drawn by Chas. Faroux, the eminent French expert: "We shall have small engines with a row of tiny pistons acting on a heavy crankshaft with big journals turning over at high speed. Thus we shall approach the characteristics of the ideal prime mover, viz., the turbine, inasmuch as we have a heavy rotating mass, upon which small and rapid impulses are imposed."

And last but not least, there is the consideration of overall length, which again turns out in favor of the long stroke, since the distance between cylinder centers is determined by the bore. The long stroke will be higher, but we still have plenty of room under the hood of the average car. What we want is space for the body builder, a short engine.

There is one argument seemingly against the long stroke engine—it has a higher piston speed. But high piston speed in itself is not objectionable, provided care is taken in piston design in order to reduce weight and friction.

The weight of an engine of given design is closely related to the displacement. Therefore the long stroke engine need not be any heavier than a square one. Crankcase and cylinder block will be higher, but shorter. All parts can be lightened, since the stresses are reduced on account of the smaller bore. The resulting engine is in no way more expensive to produce, except for one item—the crankshaft. But money put in a heavy, stiff crankshaft is well spent. The crankshaft is the backbone of the engine; reduced vibration adds directly to the life of chassis and body. Today's obvious trend towards stronger crankshafts is ample proof of this.

FRED THOMER

The statement of our correspondent that the m.e.p. is proportional to the compression pressure is not quite correct. The m.e.p. increases with the compression pressure but not in direct proportion. If the compression ratio is represented by r then the mean effective pressure varies as $(r^\gamma - r) / (r - 1)$, where γ is the exponent of the expansion curve, which for a high speed engine may be taken at 1.35. The value of this expression then becomes 0.856 for a compression ratio of 4.2 and 0.923 for a ratio of 4.8, thus indicating a gain in m.e.p. of 7.8 per cent.—Editor.

A Road Rolling Suggestion

Editor AUTOMOBILE INDUSTRIES:

The correspondence on the proper rolling of roads to prevent road corrugation is interesting. I am somewhat of the opinion that the waves we get on roads are due to the fact that road rolling is done by a two-axle machine, in which case the rear axle follows the depressions and waves caused by the front axle.

Might I suggest that authorities give some scrutiny to the three-axle machine of the rigid type, in which the natural action of the rigid fixed axle would be to roll out any waves that are caused and produce an absolutely flat surface.

It can readily be seen that in such a three-axle machine, if a hump in the road were caused, a concentration of stress on one of the other of the axles would tend to flatten this hump to the average condition of the road.

I have often wondered why this was never taken up by highway engineers or by manufacturers of road roller equipment.

JOHN YOUNGER

Supercharger Used Here First

Editor AUTOMOTIVE INDUSTRIES:

In my paper on Superchargers, presented to the Society of Automotive Engineers in Detroit, it was stated that the first use of superchargers on racing cars was made by European engineers. This statement was questioned at the meeting by Mr. Duesenberg and also by letter from Lee W. Oldfield, of Chicago.

A diligent search with the assistance of the *Motor Age* staff and the staff of *Automotive Industries* failed to disclose a description of the installation. However, in October 30, 1913, issue of *Motor Age*, in answer to an inquiry from a reader, asking for a diagram of the Chadwick carburetor showing how the pressure was obtained on the mixture, they say: "A diagram is not obtainable from the Chadwick factory, as this type is no longer manufactured. The system, however, used a three-stage centrifugal blower between the carburetor and the cylinders. The blower was driven by a belt around the flywheel and operated at six times crankshaft speed."

I believe the above is sufficient evidence to prove that the Chadwick car used a supercharger in racing before it was used in Europe.

I am very glad to be able to make this correction and thank Mr. Duesenberg, Mr. Oldfield, and especially the *Motor Age* and Chilton Class Journal Co. staff, who assisted in unearthing this information.

CHAS. R. SHORT.

Constant Mesh Transmission

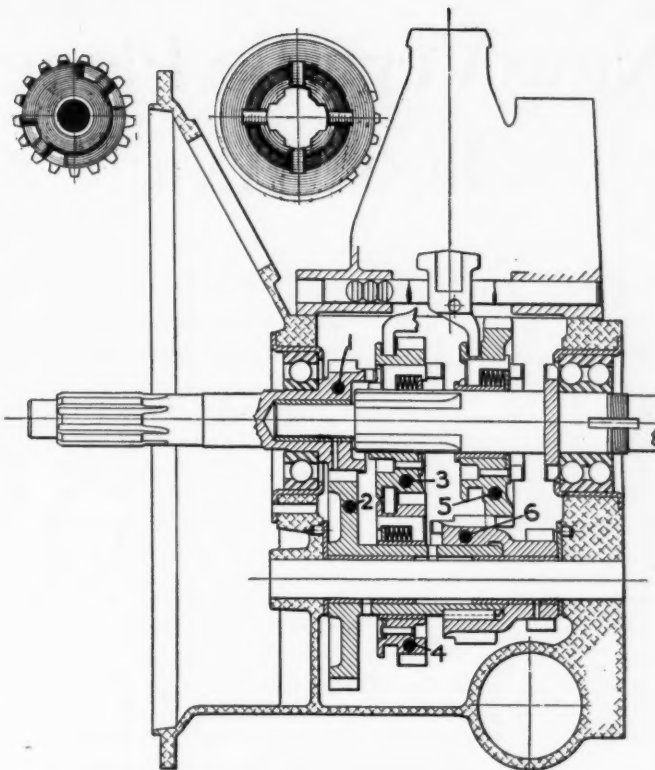
A CONSTANT mesh transmission in which speed changes can be effected with ease, and positively, at any car speed, has been developed and is being demonstrated by John Patterson of San Francisco, Cal. A sectional view of a standard transmission case with the Patterson gears installed is shown herewith.

The transmission contains the usual number of gears, which are controlled by the standard shift. Gear 3 is splined to the main shaft, while gear 4 is bushed and rotates on the countershaft. These two gears are moved endwise simultaneously by the same fork. When they are moved forward (toward the left in the drawing) gear 3 is locked to 1 for the direct drive, gear 4 then idling on the countershaft. When they are moved back (or to the right) gear 4 is locked to gear 6, which is keyed to the hub of gear 2, thus giving the intermediate speed.

Gear 5 is bushed and rotates on the main shaft. When moved forward (to the left) it is locked to gear 3, thus giving the low speed. When moved to the rear gear 5 is slid out of mesh with gear 6 and into mesh with the reverse idler. A further movement locks gear 5 to the jaws cut on the main shaft and produces the reverse.

There are four keyways in each of the gears 3, 4 and 5, in which slide $\frac{3}{8}$ in. keys backed up by coil springs. These keys take the place of the jaws of the conventional dog clutch. The gears carrying the keys are recessed to accommodate the jaws on adjoining gears. It will be noted that when the gears are in the driving position the keys are not subjected to bending stresses but merely to shear, as they are supported by the keyways both above and below the mating jaws.

The operation of the clutches is independent of the relative speeds of the parts clutched together. When gear 3, for example, is moved forward those keys not in position to mesh with the dogs on gear 1, are pushed in their keyways against the springs. Due to the fact that



Sectional view of standard transmission case with Patterson gears installed

some of the jaws are cut away, at least one key is not so depressed and remains out to engage with the jaw, whereupon all the keys snap into the engaged position and the two gears are locked together, in either direction of drive. We are informed that gears using this type of dog clutch can be substituted in standard gear boxes for conventional sliding gears without change in the method of control.

SOME time ago we reviewed in these columns a publication on Diesel Engines which the Verein Deutscher Ingenieure had issued in the English language. This has now been followed by another publication dealing with the same subject, but printed in German and entitled *Diesel Maschinen II*. It appears to be a reprint of a special number of the *Zeitschrift des Vereines Deutscher Ingenieure* issued on the occasion of a meeting devoted exclusively to these engines.

The new edition contains the following articles: Diesel Engines in America, by A. Naegel; Discussion Which Followed the Reading of Papers at the Technical Session Devoted to Diesel Engines; Diesel Locomotives From the Standpoint of Locomotive Construction, by M. Mayer; Diesel Engines and Transmission of Power for Large Oil Locomotives, by J. Geiger; High Speed Diesel Engines for Vehicles, by H. Hintz; Diesel Engines with Mechanical Injection, by W. Riehm; Crude Oil Locomotive With Compressorless Diesel Engine and Hydraulic Transmission, by W. Schumacher; Single-Acting Four-Stroke Ship Type Diesel Engine of 2000 Hp.; Experimental Results with a Hesselman Combustion Engine, by E. Hubendick; Compressorless Diesel Engine, by W. Laudahm; Compressorless Operation of Diesel Engines, by Fr. Schultz; Compressorless Oil Engines, by E. Kux.

The publication is illustrated with 358 cuts in the text and two folding plates. It contains 96 pages of about the same size as those of this paper. The publishers are VDI Verlag, C. M. B. H., Berlin SW-19, Germany.

New Verville Plane Has Folding Wings, Oleo "Axleless" Undercarriage

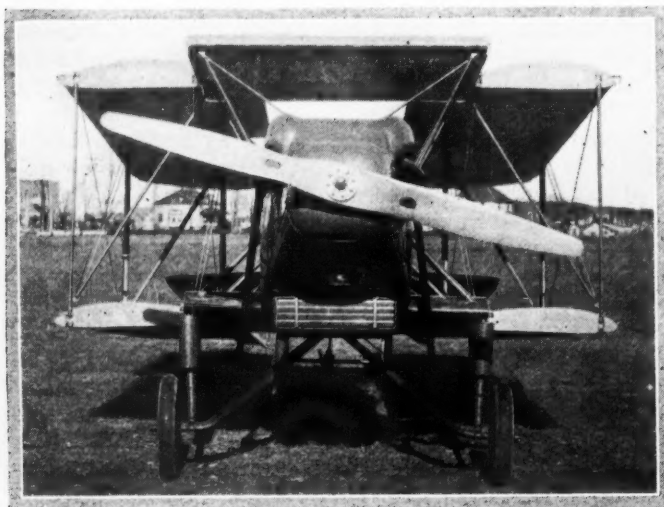
Other new features incorporated for first time in commercial aircraft design. Machine carries two passengers and is fitted with a Curtiss 90 hp. OX-5 engine.

By Leslie S. Gillette

SEVERAL important features destined to play an important role in the design of modern commercial airplanes are embodied in the new three place "Verville-Airster" planes now in production by the Buhl-Verville Aircraft Co., Detroit. The machine is of the smaller type of conventional biplane fitted with a 90 hp. Curtiss OX-5 engine, which gives the plane a speed of 95 m.p.h. Where higher performance and greater range is required several other powerplants, including the Wright 200 hp. air-cooled model, the Curtiss 160 hp. C-6, or 180 hp. Hispano-Suiza engines, may be installed without any changes in the structure of the machine.

Four factors—maximum life and durability; simplified maintenance; low operation costs; and a high factor of safety—considered essential in the operation of private airplanes have necessitated departures from conventional practice. To obtain these characteristics the "Verville-Airster" planes employ folding wings; an Oleo "axleless" undercarriage; detachable engine mountings; interchangeable wings, ailerons and tail control surfaces; steel tubular fuselage; and crash-proof tanks.

Because the manufacturers consider these points to be the most important in the development of a strictly commercial airplane, the "Verville-Airster" planes will not compete in price with similar machines in this class already in production. With the regular engine equipment the planes will sell for \$5000 and it is said by the



This front view shows the unusually wide "axleless" Oleo undercarriage of the "Verville-Airster." The exhaust pipes lead downward from the engine to points below the wings. The propeller is of the Reed duralumin type. Note the folded position of the wings

"Verville-Airster" Specifications

Span, wings extended	35	ft. 8 in.
Width, wings folded	12	ft. 6 in.
Chord	4	ft. 7 in.
Overall height	8	ft. 10 in.
Overall length	24	ft. 7 in.
Area main wings complete	303	sq. ft.
Area horizontal tail surfaces	37.7	sq. ft.
Area vertical tail surfaces	15.1	sq. ft.

With Curtiss OX-5, 90 hp. Engine

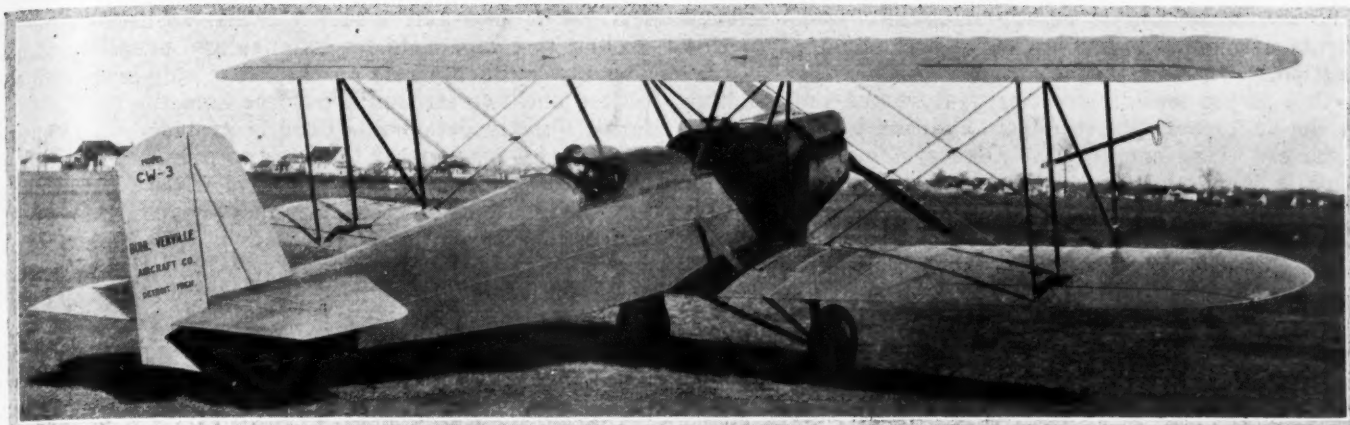
Speed	95	m.p.h.
Landing speed	40	m.p.h.
Endurance at high speed	5	hrs.
Service ceiling	10,000	ft.
Weight empty	1426	lbs.
Pay load	330	lbs.

makers that the price could be reduced by \$1000 if current designs were followed.

Universal application of the Verville plane to any of the lighter phases of commercial aviation is provided for in the design, it being possible to convert the ship quickly for use in crop dusting, aerial photography and survey, air mail feeding, and light freight carrying. As the pay load is carried in center of ship only minor changes, including the removal of the seat in the front cockpit, are necessary to change the plane from one purpose to another.

Many of the structural features on the "Verville-Airster" planes have been employed only on military aircraft up to the present. In manufacture, the system of inspection is the same as employed on Government machines while the specifications for materials and finishes conform with the requirements of the air services. Careful consideration has also been paid to the design so that the plane will conform to the recommendations and stipulations of the American Aeronautical Safety Code.

Since the recent test flights of the original "Verville-Airster" at Packard field, over 400 inquiries have been received and the first batch of six machines will be completed by May 1. Among the purchasers of the first production planes is Henry S. duPont of the General Motors Research Corp. The chief engineer and vice-president of the company building the planes is Alfred A. Verville, one of the best known airplane engineers in the country and designer of the winning planes in the 1920 and 1924 Pulitzer speed classics.



Rear view showing general design of the fuselage and wings of the Verville plane. The absence of control wires running to the tail and ailerons is a particular feature

In future models steel and duralumin will be used exclusively in the structure of the planes while the first six machines will employ steel tubular fuselages and tail control surfaces with the wings of conventional wood form, all being fabric covered. The longerons of the fuselage are each formed of three sections of steel tubing with the fish-mouthed joints welded and the diameters of the tubing tapering towards the tail. As will be seen from the accompanying illustrations, no bracing wires are employed, all members of the fuselage being steel with the joints welded to form an integral truss structure. The steel tubing is of S.A.E. 1025 specifications. At the intersection of number two and three vertical bay struts a framework is formed integral with the fuselage to provide the mounting for the folding wings, the anchoring for the undercarriage and a walk for the passengers entering the front cockpit.

Powerplant Mounting

The mounting of the powerplant is of unusually simple design, consisting of a pyramid formation which supports the engine at approximately the center of weight. The two struts on each side are anchored at their base to swivel joints welded at the points where the longerons of the fuselage terminate. This allows the engine to be removed as a unit and any other form of powerplant of suitable size substituted, while it also permits the base of the regular equipment engine to be detached and an inspection made.

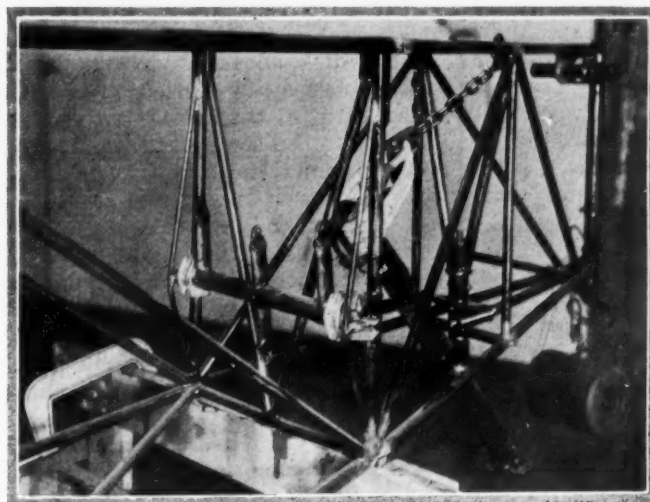
The engine bearers are of ash held at both the apex of the pyramid mounting and at the rear to a tubular cross brace just ahead of the steel fireproof bulkhead. Immediately behind the latter a 40 gal. fuel tank formed of welded aluminum and crash-proof is installed. To the rear of this is the upholstered passenger cockpit which seats two persons side by side and access to it is by means of a hinged door on the right side of the fuselage. All engine controls and instruments in the rear or pilot's cockpit are of the approved army type and dual controls are provided. Extra large windshields are provided for both cockpits and by carrying the engine exhaust down below the lower wings it is possible to converse while the plane is in flight.

Wing construction is of conventional form consisting of solid spruce main spars, spruce flange ribs with mahogany face and box type compression ribs. From the leading edge to past the main front spar a strip of duralumin sheet is employed while the internal drag wires are double throughout. Wing folding is accomplished by hinges on the rear spars of the upper center section and the lower wing butts. The fittings are so designed that the main surfaces can be folded back on the field in 12

minutes without the removal of any cotter pins, safety wires or disturbing the interplane adjustment. To support the front of the wings during the folding operation a jury strut is provided which can be carried in the fuselage during flight.

Several advantages are claimed for the use of folding wings. First, a much smaller hangar is necessary and several planes can be stored where only one could be housed with the rigid wings. Second, if a pilot in landing discovers the field he has alighted in is too small to take-off again, he has only to fold the wings and tow the plane behind an automobile to a larger field. And finally, this type of construction offers possibility of using a greater number of planes for shipboard use with the fleet. On the later production jobs, roller bearings will be employed on the axles, which will allow the planes to be towed any distance if necessary. As the total width of the plane does not exceed the maximum width permitted for large trucks the planes can be towed from the factory through the city traffic to the flying field.

The wing cellule is a single bay without stagger, which greatly simplifies maintenance. Both upper and lower wing panels are interchangeable as are the ailerons. The latter are so designed that those on one side can be operated independently from those on the other side, so that in case of accident to the controls on one side the others will still be operative. Interplane struts are "N" shaped and formed of streamlined steel tubing while all flying, ground and drag wires are of true streamline.



This view of the tail shows the welded steel construction of the fuselage

The center section is rigidly mounted by the cabane struts arrangement and no wires are employed in this section.

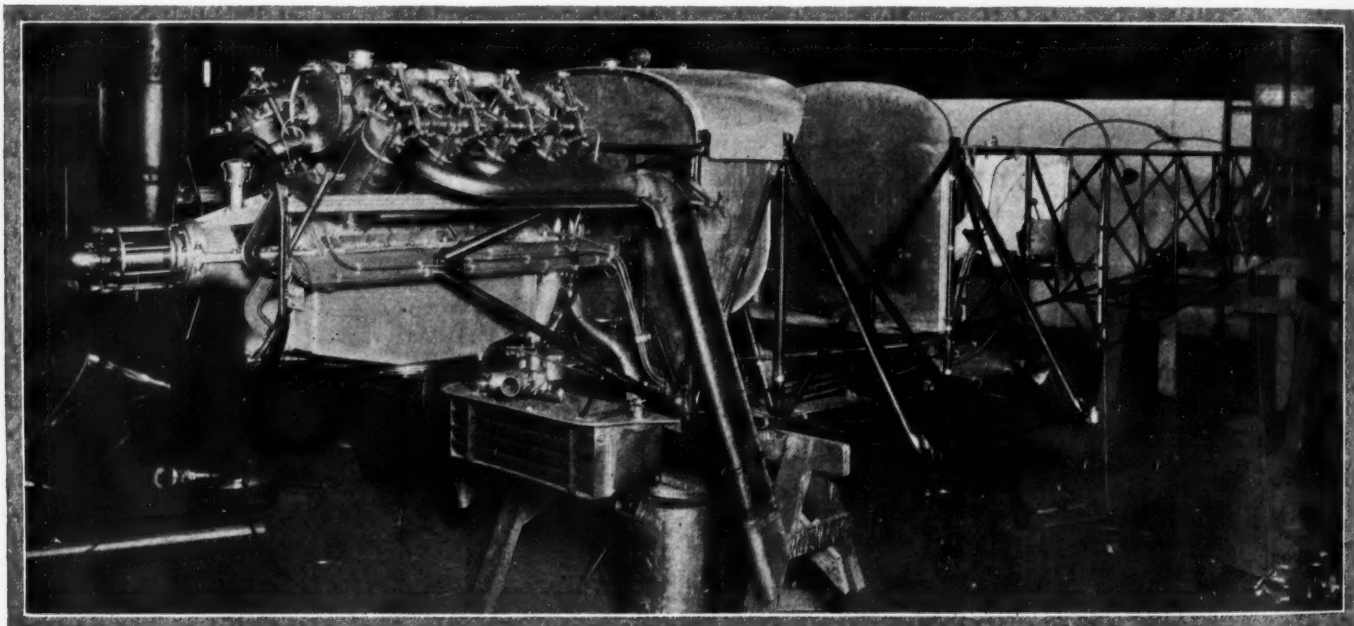
One of the most interesting features of the machine is the undercarriages, which in addition to being of the "axleless" type employs the Oleo system of springing. This is the first time this system has been adopted on American-built planes although it has been used continuously on European aircraft. The combination of these two principles in landing chassis construction enables the plane to ride over obstructions which would catch the straight axle, and the Oleo system absorbs the energy of impact in landing which reduces the stress transmitted to the frame of the machine. The wide tread gives stability to the plane on the ground and prevents damage to the wing tips in taxi-ing.

By anchoring the upper ends of the rear struts of the undercarriage to the fuselage, the wheels tend to move forward and describe an arc about the anchorage point in landing which gives a better cushioning effect and relieves the machine of strains. The wheels have an 8

incher. The two last mentioned are adjustable on the ground to compensate for balance and propeller torque. Two streamlined struts on the lower side brace the stabilizer and two streamlined wires hold the fin rigid. A large, quickly detachable door is provided on the right side of the fuselage at the rear to permit inspection of the controls and tail skid. Control wires for the elevators terminate on a cross shaft just ahead of the tail skid and connection with the elevators is by a single rod on each side and below the surfaces. All controls are direct and positive in action with stops provided to limit the movement at the extremities of their travel.

Alemite fittings for high pressure greasing are screwed into split aluminum bearings which are employed throughout the control system. At other points where movement takes place, such as the hinges for the folding wings and the undercarriage joints, Alemite fittings are also provided.

Cowling completely encloses the standard Curtiss powerplant and by removing four bolts the entire lower covering can be detached, exposing the base of the en-



Tubular steel fuselage with the Curtiss engine mounted in place. Supports for the powerplant are extremely simple. Note that no bracing wires are seen

in. travel in the shock absorber and keep in track under all conditions.

The actual Oleo mechanism consists of a combination oil-hydraulic and rubber disk shock absorber. Under loading conditions the rubber disks carried on the outside of the main vertical strut of the chassis are in compression. In the interior of the steel strut an internal perforated plunger piston simultaneously travels into a loaded oil chamber at the lower end of the strut thus absorbing the impact energy and neutralizing the rebound effect of the rubber disks. The actual impact of landing is taken by the oil plunger but the taxi-ing and main weight is taken by the disks. Patents have been taken out regarding several features of the landing gear. As there are no transverse struts and the track of the wheels is wide, the plane is ideally suited for photography and dusting. The tail skid is rubber sprung and steerable, with its lower end shrouded in a manganese steel shoe to resist wear in taxi-ing.

All tail surfaces are built in the same manner as the fuselage. The unit consists of a rudder and elevators which are interchangeable, a vertical fin and the stabil-

izer. The two last mentioned are adjustable on the ground to compensate for balance and propeller torque. Shutters and controls of the army type are installed to control the water temperature in flight. In this respect it may be mentioned that several other units connected with the engine such as fuel filters, gages and controls are regular equipment of the latest army planes. In the fuel tank a reserve supply compartment is fitted and the feed to the carburetor is by gravity controlled by a three-way valve in the pilot's cockpit.

The latter is provided with a parachute type of seat and a service safety belt while a fire extinguisher is installed close on the outside of the fuselage. When the seats and controls are removed from the front cockpit there is a rectangular clear cargo space of 22 cu. ft. capacity. A Reed duraluminum one-piece propeller is fitted as regular equipment.

Many civilian, army and navy pilots have flown the first machine and reports indicate that it maneuvers well, can be stunted with safety and will not fall into a spin when stalled.

EDITORIAL

Export Markets Need Watching

AUTOMOTIVE export sales have been going along at an excellent pace ever since the first of the year. In practically all automotive lines definite gains over 1925 were made during the first quarter and business seems to be holding up well in April so far as can be determined.

While last year's export totals are almost certain to be exceeded this year by a good margin, unfavorable reports from certain areas cannot be neglected. Department of Commerce bulletins discussing market conditions during the first quarter in foreign countries indicate unsatisfactory situations in several territories among which are Belgium, France, Germany, Porto Rico, and the Union of South Africa. The last mentioned is perhaps the most important from a general automotive export standpoint and its lack of buying is attributed to "poor crops in the agricultural districts and consequent restriction of trade."

Export business may be expected to continue definitely on the up grade for a good many years to come, but exporters need to keep in touch with trends in specific markets and fluctuations in local buying tendencies just as they do in merchandising to various domestic territories.

Railroads More Friendly

RAILROAD officials heretofore have seldom gone out of their way to present to the public complimentary facts about the automotive industry and its true place in the transportation picture; on the other hand, they have been prone to regard it in a competitive light and to speak of it either in deprecatory tones or to ignore it. That is not entirely to the discredit of the railroaders. It is simply human nature and business. None of us feels too kindly disposed toward the other fellow if we think he is tramping on our toes. Canal men, in an earlier period of transportation, were antagonistic to the railroads, and, before that, the operators of overland wagon routes were antagonistic to the canals. And so it goes. But antagonism never suppresses a worthy service.

That the railroads some day would have to welcome the automobile into the transportation family as an equal has long been a foregone conclusion and a speech by Ralph Budd, president of the Great Northern, at a recent meeting of the American Engineering Society, seems to indicate that the reconciliation is taking place.

Mr. Budd presented figures which showed that there is more capital invested in highway transportation than in railroads. "Twenty-five years ago," he said, "the inventory would have been blank so far as modern highway transportation is concerned. The most

phenomenal of all industrial developments, the automobile industry, is the youngest in the United States. It is barely 25 years old, yet its importance is so great, taken as a whole, that the railways gain much more from the freight traffic it gives them than they lose from the freight and passenger business it takes away.

"There is no need to discuss it, except to emphasize that when the public finds something which it approves of and desires, its response is quick and emphatic."

That last statement, coming from a railroad man, is almost revolutionary.

Higher Oil Engine Speeds

IT is generally well known that the heavy oil engine has made rapid strides in the marine field during the past decade, and about half of all of the shipping now under construction is of the motor-type; in fact, at a recent meeting of ship-builders in England one of the speakers predicted that some of the members of his audience would live to see the day when a steamship would be as rare a sight as a sailing vessel is today.

However, the steam engine interests are not going to give up the field which they have controlled for so long without a struggle, and great efforts are being made by them to improve the thermal efficiency of marine steam powerplants, by such means as higher steam pressures, higher degrees of superheat, feed water heating, air-regenerative heating, etc. As a result of these improvements the thermal efficiency of the steam powerplant has been materially increased in recent years. On the other hand there has been no notable improvement in the efficiency of the oil engine since the early days of the Diesel.

It is now suggested that commercial advantages could be secured by running marine type oil engines at higher piston speeds. By so doing the power output from an engine of given dimensions could be increased and the fuel consumption per horsepower-hour decreased. Disregarding the decrease in volumetric efficiency which usually accompanies an increase in speed—and which can be minimized by the use of larger valves—the higher speed engine is naturally a more efficient engine. One marked advantage of high speed operation is that it is not necessary to use the large number of piston rings and the high pressure of rings that are common in low speed Diesel engines.

On learning of these developments one cannot help feeling that designers of marine powerplants are taking a leaf from the book of automotive engineering practice.

AUTOMOTIVE **NEWS SECTION** INDUSTRIES

Philadelphia, Pennsylvania

Thursday, April 22, 1928

Sales Continue Expansion; Production Fairly Stable

PHILADELPHIA, April 22—Expanding sales and fairly stable production at high levels continue to characterize the automotive situation. Whatever there may be of uncertainty about the business situation and of fear of what the stock market portends apparently has not yet affected the sales of automobiles, trucks and buses. The manufacturers, therefore, are following production schedules laid out in many cases before the stock market started its downward course.

A few men have been laid off at the automobile plants, but this mainly represents a decline in production of parts, with the rate of assembly unchanged. Inventories built up during the winter are thereby being reduced. In two or three instances, production is actually being stepped up.

The satisfaction generally felt with the state of the industry is enhanced by the consideration that the early spring weather has been by no means ideal for the sale of cars, particularly in the northern states. Even farther south, however, the weather has not been as warm as it usually is in April.

Bus Expansion Continues

The most rapid expansion just now is taking place in bus production and sales. New routes are being opened almost daily, and participation of railroads and electric railway companies in motor coach use is proceeding at a rate no one could have dared hope for a year ago. Truck business, while not developing in so spectacular a fashion, is nevertheless far ahead of the levels of last year.

In the search for wider markets, under the stress of the most intense competition the industry has ever known, there has been speculation as to the possibilities of cars of a smaller type than has hitherto been the rule in American passenger car design. These vehicles would be capable of ready maneuvering in traffic and of parking in small spaces, while their economy would be expected to prove another good selling point, especially in the export markets.

Sales of tires and parts are showing the normal seasonal upswing as motor- ing becomes more general and active.

New Reorganization Plan for Murray to be Considered

DETROIT, April 21—A new plan for reorganizing the Murray Body Corp. will be submitted at a meeting of stockholder, bank and creditor committees which will be held either late this week or early next week. The plan submitted at a recent meeting failed to meet with the approval of all interested.

Need Quieter Power Plants, Says Crane

NEW YORK, April 21—The rapid rise to popularity of the closed car and the tremendous increase in mileage of improved highway, has made it necessary to seek smoother, quieter power plants, according to Henry W. Crane, technical assistant to the president of the General Motors Corp., who presented a paper on passenger car engines before the Metropolitan section of the Society of Automotive Engineers this evening.

Mr. Crane traced the evolution of the passenger engine and discussed the advantages and disadvantages of the various types that had been used. His talk was illustrated by a large number of schematic drawings showing the various designs and by charts comparing the dynamic loads on the bearings in the different types.

Electric Truck Held Best for Short Haul

PHILADELPHIA, April 21—Electric trucks were recommended for use in delivery work where the haul is comparatively short and where there are no heavy grades to be negotiated, by Fred Smith, delivery superintendent of the Eleto Co., New York, in a paper read before one of the sessions of the tenth annual convention of the Retail Delivery Association being held in this city. From the experience which his company has had with electric trucks for short haul delivery work Mr. Smith gave considerable data concerning the relative efficiency of gas and electric vehicles as well as suggestions for operating and maintaining electrics.

Robert Hebron, garage manager, R. H. Macy & Co., New York analyzed the various component parts of light delivery trucks for the purpose of determining what designs are best suited for delivery purposes. The main items which he believed should be given greater consideration by manufacturers were accessibility

of parts which require frequent repair and adjustment and standardization of nut and cap screw sizes so that fewer tools will be required to make them. In general, his opinion seemed to be that the present designs commonly used in light trucks are satisfactory.

Viles Sees Tire Price Slash in Near Future

PHILADELPHIA, April 22—Speaking before the monthly meeting of the Motor Truck Association of Philadelphia, last night, A. L. Viles, general manager, The Rubber Association of America, offered the opinion that tire prices would drop in the near future. This opinion was based on the fact that present production of tires is utilizing crude rubber bought several months ago and at much higher prices than now prevail.

Peerless in Opening Quarter Nets \$205,802

CLEVELAND April 21—Net profits of the Peerless Motor Car Corp. for the first quarter, after depreciation and taxes, were \$205,802, comparing with a \$280,514 loss in the corresponding period of 1925, according to announcement by Edward Ver Linden, president and general manager.

Gross sales for the quarter were \$4,460,878, an increase over the 1925 first quarter of \$1,111,062.

Chrysler Dealers Reelected

DETROIT, April 21—Current retail sales of Chrysler cars are at the best rate in the history of the corporation. W. P. Chrysler declared at the annual meeting of the Chrysler Corp. board of directors. During the last year, he said, the dealer organization, now numbering more than 4300, was increased 60 per cent. Dealer stocks of new cars are normal for the volume of business and used cars are at the lowest point in five months, he declared.

All directors were reelected.

Eaton to Alloy Steel

NEW YORK, April 21—The board of directors of the United Alloy Steel Corp. was organized at its annual meeting held here yesterday. Following is a list of the new and re-elected members: C. S. Eaton, Cleveland; J. O. Eaton, Cleveland; Philip Wick, Youngstown; H. Coulby, Cleveland; Jay C. McLaughlin, Cleveland; Bayard Dominick, New York, and George H. Charls, L. G. Pritz and C. W. Krieg, of Canton, Ohio.

Although control of United Alloy has passed to the Eatons, it was indicated that they have no intention of making any change in management at this time.

Car Prices Are Cut in Canada— Manufacture May Be Stopped

PHILADELPHIA, April 22—The automobile industry is wrestling with probably the most acute emergency problem it ever faced, as a result of the introduction a week ago of a Canadian budget incorporating drastic reductions in import duties on cars and trucks. Prices have been reduced by some companies, and others are apparently still working on schedules, but back of the price situation is the more important prospect of an early abandonment of nearly all Canadian manufacture and assembly of American cars.

The situation is complicated by the fact that dealers are facing losses of millions of dollars on cars priced under the old tariff. Rebates to dealers covering losses on new car stocks are unlikely, with the exception of one or two companies that are committed in this respect. General Motors dealers are protected against price reductions under their contracts and of course will be rebated.

Rebates would mean the loss of profits from Canadian operations for the last year to 18 months, it is pointed out. There have been no reserves against such a contingency and the feeling among manufacturers is that the Government should in fairness have provided some means of reimbursing dealers.

Largely because of unsettled conditions and the intricate application of revised tariff and tax provisions, new retail prices have been announced only for the Ford, Essex, Hudson, Overland and Willys-Knight. Dealers handling other makes, were largely taking orders tentatively, quoting prices subject to change.

Reduced Prices Announced

One large distributor in Ontario has announced a new price on the Essex coach of \$1025 delivered at door with all taxes and freight paid, the old price being \$125 higher. The new price on the Hudson coach is \$1565, a reduction of \$195. The Canadian Ford company announces a new price of touring model without starter at \$415, freight and taxes extra, as compared with old price of \$440. Tudor Ford is down from \$695 to \$650, freight and taxes extra, and Fordor is reduced \$45. These prices compare closely with those at which Fords could be imported with duty paid.

An Overland dealer at Ottawa announces new price on Canadian made 4-cylinder Overland touring model as \$780, all charges paid, as compared with old price of \$845. Six-cylinder Overland sedan is \$1610, reduction of \$215 and Willys-Knight touring, model 70, is reduced from \$2125 to \$1920 at Ottawa. The larger Knight 5-passenger sedan has dropped from \$3840 to \$3505.

There is an evident tendency on the part of many in the Canadian industry to go slowly and await developments, particularly in view of the fact that two huge deputations, one from the automobile workers, merchants and civic officials of Oshawa, Toronto, Hamilton and other cities, representing the manufacturers, and another of workers of the industry to the number of 2000 have been organ-

ized to wait upon the Cabinet, the manufacturers April 28 and the workers April 23.

While there is thus organized opposition, both by industry as well as in Parliament, little expectation of a change or modification is entertained. It is admitted that the reductions are very popular with the farmer element and the average person even in the industrial centers. The budget has never been voted down in the history of Canada, and though sometimes corrected in some details has never been changed in essentials.

The principal gainers through the reductions, aside from the Canadian purchaser, will be American manufacturers who have had no Canadian plants. The others will probably decide to abandon manufacture and assembly across the border, with the exception of Ford of Canada and possibly General Motors which may expand its Chevrolet operations.

Lower Rate on Unit Parts

With a basis tariff of 20 per cent on cars and trucks selling at \$1200 or less retail in the United States in effect and 27½ per cent on cars of higher value in effect from April 16, a bulletin has just been issued, apparently through an error of the Customs Department at Ottawa, extending the reductions to unit parts, which was never contemplated in the original plan. The resulting confusion in Canadian ministerial circles equals the confusion in Canadian automotive circles generally. It is possible that the Government may work out a plan by which the bulletin may be recalled or the reductions otherwise cancelled.

Apparently airplanes and airplane parts benefit from reductions, but considerable confusion exists as to just how they are classified.

It is hoped that the new tariff will stimulate car sales in Canada and thus result favorably for nearly all concerned, but it is pointed out that the reductions for the time being at least will benefit only buyers without trade-ins, as used-cars values are automatically depreciated.

Peugeot Plant Reported

DETROIT, April 22—The Peugeot company of France will establish a branch here for the production of light cars, according to reports. Lucien Rosengart, managing director, is here preparing plans.

Business in Brief

Written exclusively for **AUTOMOTIVE INDUSTRIES** by the **Guaranty Trust Co., second largest bank in America.**

NEW YORK, April 22—The persistence of unseasonably cold weather last week interfered with both trade activity and agricultural operations. Largely for this reason, retail business was apparently in somewhat smaller volume than a year ago. Industrial operations in general continued substantially above the level of last spring. Commodity prices were firmer than they had been for some weeks, while stock quotations moved irregularly, without any well-defined trend.

LUMBER PRODUCTION

Production of lumber in the first twelve weeks of 1926 was 1.8 per cent larger than in the same period of 1925, 1 per cent above 1924 and 10.7 per cent above 1923. Orders received by manufacturers during the same period were 10.9 per cent above production, and 13.9 per cent above orders a year earlier.

BUILDING CONTRACTS

Building contracts awarded in 37 States last month, according to the F. W. Dodge Corporation, had a total value of \$597,879,300, the largest March figure on record, bringing the total for the first quarter of the year to \$1,444,938,000. This compares with \$1,111,364,000 in the first three months of 1925.

IMPORTS AND REPORTS

For the third consecutive month, imports of merchandise into the United States in March exceeded exports by a substantial margin. The import surplus last month, according to the preliminary figures, was \$70,000,000, the largest on record, and brings the total excess of imports for the first quarter of the year to \$125,000,000. The export balance in the first three months of 1925 amounted to \$206,000,000.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended April 14 were 11.2 per cent below the total for the preceding week, but 14.4 per cent above that for the similar period last year.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 151.6 last week, as against 150.7 a week earlier and 153.6 four weeks earlier.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve bank increased \$77,900,000 during the week ended April 14, with a decline of \$1,300,000 in discounts overbalanced by gains of \$44,300,000 in open market purchases and \$35,000,000 in Government securities. Note circulation rose \$28,200,000, deposits \$68,700,000 and reserves \$5,200,000. The reserve ratio declined from 74.6 to 73.0 per cent.

Goodyear to Expand at \$2,000,000 Cost

AKRON, April 21—Reports were confirmed here today by officials of the Goodyear Tire & Rubber Co. that the company intends to expand its textile manufacturing activities at Cedartown, Ga. The expansion, it is said, will involve an expenditure of about \$2,000,000. Goodyear recently purchased a cotton manufacturing unit of the Cedartown Cotton & Export Corp. and is to operate it under the name of Goodyear Clearwater Mills, Inc.

The expansion will include erection of a new building 500 x 140 feet and two stories high; erection of about 100 houses for mill workers who number approximately 600, and removal of equipment from the fabric mills recently purchased at Passaic, N. J., to Cedartown.

With realization of the expansion program, the Cedartown plant will become the largest of the five units operated by Goodyear and its subsidiaries.

Boyce Plant Moved

NEW YORK, April 17—Boyce & Veeder Co., Inc., maker of Boyce-ite, has moved its office, headquarters and plant from Long Island City to Farmingdale.

To Form Aero Corp.

NEW YORK, April 20—Capt. Anton Heinen, under whose supervision the dirigible Shenandoah was built, announces that he and his associates are preparing to incorporate the Aero Corp. of America with \$2,500,000 capital to begin in the spring of 1927 an airship service between Atlantic City, New York and Philadelphia.

The plan is for the service to start from Atlantic City in the morning, return there after landing on the Jersey side of the Hudson river, opposite New York, and then make for Philadelphia, returning to Atlantic City before night-fall.

German Perrot Brake Company is Organized

FRIEDRICHSFELD, BADEN, GERMANY, March 30—German Perrot Brake A. G. m. b. H. has been organized here to manufacture brakes of the Perrot and Bendix-Perrot type. The new firm is financed by Heinrich Lanz Co., Mannheim, Roehling-Buderus Co. in Wetzlar and Fulmina Works in Friedrichsfeld.

The firm is the exclusive licensee under Perrot and Bendix-Perrot German patents.

Waller Buys Harris

WATERLOO, IOWA, April 17—O. L. Waller, of the Waller Mfg. Co., returned this week from Oklahoma City, Okla., and announced that he had purchased the Harris Mfg. Co., and will move its plant to the Waller factory here. The Oklahoma City firm made the Harris rubber-snob shock absorbers and the Waterloo concern has exclusive manufacturing rights on the patent.

Indiana Changes Name

HAGERSTOWN, IND., April 22—The name of the Indiana Piston Ring Co. has been changed to the Perfect Circle Co. in order to more closely identify the company with the product. The change is in name only for there will be no change in policy or management of the concern.

American Bosch Adds More Radio Outlets

SPRINGFIELD, MASS., April 21—American Bosch Magneto Corp. is taking steps to strengthen its facilities for distributing its radio sets. Morris Metcalf, treasurer, has returned from an extended trip which took him to the Pacific coast, primarily to study the problem of making the best connections for this line.

Plans for the coming season were taken up in detail with Bosch branches in Chicago, Detroit and San Francisco, and arrangements made to improve distribution in other centers. This involves the appointing of numerous new agents and, in some instances, the separating of the company's radio and automotive lines in a given territory.

Would Maintain Tie-up

Wherever practicable, however, these are kept together, it being felt that the radio distributor who has no other strong line to tie up with is at a disadvantage owing to the seasonal fluctuations of the business. By May 15, it is expected, samples of the new Bosch sets will be in the hands of distributors, and by July 1 it is hoped that regular production will be making good headway.

American Bosch is running strong for the time of year, stocks in the starting and lighting and ignition equipment being accumulated two months ahead of the usual volume, preparatory to the transfer of this business to the Electric Auto-Lite Co. of Toledo, July 1. A good rate of production is being maintained in magnetos, timers and windshield wipers. Night shifts are being worked in some parts of the plant.

Developments of the Week in Leading Motor Stocks

NEW YORK, April 22—The Stock market during the past week drifted aimlessly without indicating a trend in either direction. Trading was dull in most issues and of a highly professional character. Brokers' loans continued to recede emphasizing the lack of outside participation in the market.

Motor stocks moved in sympathy with the rest of the list and were practically featureless. There was a flood of good news from manufacturing centers testifying to the high rate of current operations. In one respect, however, this cheerful picture was disturbed when Detroit announced that the Hudson company had again reduced its shipments to a schedule of 900 cars a day against a schedule of 1600 a day at the beginning of last month. To this extent the market's forecast of a change in the motor situation has been justified by subsequent "bad news." There was some selling of Hudson on the announcement but it was of poor character and the stock gave little ground.

The upset in the Canadian automobile

industry by the proposed tariff reduction on imports of cars received bearish interpretation in trading circles. Following announcement that General Motors had closed its plant in Canada temporarily, a vicious selling drive was launched against General Motors which has been one of the strongest issues on the list and quotations receded to the resistance point of 115. After the financial district had an opportunity to analyze the situation and it was pointed out that any reduction in the Canadian tariff would benefit American producers by opening up the Canadian market to lower priced American cars, the stock regained most of its loss.

Jordan Motor issued its statement of earnings for the first quarter of the year showing net profit of \$146,381 equal to \$1.03 a share on the 126,000 shares of common stock. This showed the quarterly dividend of 75 cents a share earned by a fair margin and reflects some improvement in the company's business over the first quarter of 1925. The stock touched its lowest price on the move at

31½ but subsequently rallied to above 35.

Hupp Motor issued a satisfactory report of earnings for the first quarter, showing net profits of \$1,122,308 equal to \$1.22 a share on 913,809 shares of common against 93 cents a share in the first quarter of 1925. As Hupp is paying only \$1 a share in dividends annually and has earned more than this amount in the first three months the prospects of an increase in the rate are promising. The company seems to be fulfilling the predictions of its management early this year that it would increase business 50 per cent in 1926. Although operations in the first quarter were affected to some extent by the failure to secure sufficient bodies for its needs the earnings showing is considered gratifying.

Another issue which is in position to benefit from any improvement in market sentiment is Willys Overland common. There was some delay in getting the new Willys-Knight 70 into quantity production with the result that a large back-log of orders has been built up which would insure substantial production.—E. S.

S.A.E. Plans Service Transportation Meet

Three-Day National Event in Boston Will Cover Broad Technical Program

NEW YORK, April 22—The Society of Automotive Engineers will hold a three-day national automotive transportation and service meeting in Boston on Nov. 16, 17 and 18. Plans are now being made for the event and their completion will include invitation of members of all societies and associations interested in the subjects to be discussed.

Technical sessions will be held in the forenoon and afternoon of each of the three days. They will be devoted to discussions of problems of design, engineering, operation and maintenance of trucks and motor coaches. Recognized experts will make addresses on the subjects of coordination of motor coach systems and railroads, the operation and maintenance of motor truck and motor coach fleets, freight handling and store-door delivery by automotive equipment, the handling of goods in interchangeable containers, the cost of operating gasoline-electric vehicles, the brake requirements of trucks and coaches, maintenance tools, and the relation of design to the power characteristics of the engine.

Will Inspect Plant

On the second day of the meeting an inspection trip of interest will be made to the maintenance plant of a Boston company that operates a great number of motor trucks. A banquet will be held on one of the evenings.

The following make up a special committee appointed to select the subjects and speakers for the three-day sessions:

J. F. Winchester, Standard Oil Co., Baltimore, chairman; H. R. Cobleigh, National Automobile Chamber of Commerce, New York; C. O. Guernsey, J. G. Brill Co., Philadelphia; A. W. Herrington, consulting engineer, Washington; F. C. Horner, General Motors Corp., New York; F. E. H. Johnson, Noyes-Buick Co., Boston; A. F. Masury, International Motor Co., New York; V. A. Nielsen, V. A. Nielsen Co., Boston; R. E. Plimpton, McGraw-Hill Publishing Co., New York; F. J. Scarr, Pennsylvania Railroad Co., Philadelphia; E. W. Templin, Six Wheel Co., Philadelphia; G. S. Whitham, Charles St. Garage Co., Boston.

Would Merge Aircraft Buying

WASHINGTON, April 22—Coordination of plans for procurement of aircraft for the Federal Government through a single agency is proposed in a bill introduced by Representative Vinson of Kentucky. The board's duty would be to coordinate all plans for procuring aircraft, aircraft engines, accessories and equipment and to make recommendations to the head of the department or independent government agency concerned.

FORD BERLIN PLANT NOW IN OPERATION

NEW YORK, April 19—According to advices received here, the German plant of the Ford Motor Co. at Plotzensee, a Berlin suburb, began operations April 15 with a production schedule for the first month of 700 cars.

The building has two acres of floor space and 1000 feet of water front along a barge canal. Equipment for the plant was shipped from the Antwerp Ford plant, from the display assembling line at Wemberley, England, and from Detroit.

Gardner Sales Volume Doubles in 1st Quarter

ST. LOUIS, April 17—Shipments of Gardner Motor Car Co. in the first quarter of 1926 represented a sales volume of approximately \$1,200,000, an increase of more than 100 per cent over sales for the same period in 1925. The company reports a present daily rate of 30 cars. The dealer organization numbers approximately 400 with more being steadily added. A healthy increase in export business is reported.

The financial position is reported as entirely satisfactory, with a ratio of current assets to current liabilities of about seven to one.

New Drivurself Stations in All Coast Cities

SAN FRANCISCO, April 20—The Yellow Drivurself Stations, Inc., recently organized with John Hertz, of Chicago, as president; William Wrigley, Jr., vice-president; Albert Lasker, Herbert Fleishacker and other capitalists as leading members, will have its headquarters in San Francisco, and will operate a complete chain of automobile-renting stations from San Diego to the Canadian border, according to a statement issued here. Capitalization is \$5,000,000. One of the features of the chain of stations will be that a patron may rent a car in one city, drive it to another and there return it to the station of the Drivurself corporation, paying the rental there. This service is new to the coast.

Gasoline Use Jumps

NEW YORK, April 20—Consumption of 581,228,000 gallons of gasoline during January and February in 33 states in which gasoline taxes are levied, this year as well as last, compared with 483,454,000 gallons for same months last year, an increase of 97,774,000 gallons, or 20.2 per cent, according to the American Petroleum Institute. Daily average consumption increased from 8,216,000 to 9,878,000 gallons.

Texas showed the largest consumption and Florida the largest gain in consumption. Slight decreases were reported in Indiana, Kansas and Wyoming.

Overland to Expand Factory at Elmira

John N. Willys Announces Plan for \$2,000,000 Expansion —Need More Parts

ELMIRA, N. Y., April 21—John N. Willys, former resident of this city and president of Willys-Overland, Inc., of which the Willys-Morrow Co. of Elmira is a part, made a tour of inspection of his organization's local holdings last week. Mr. Willys announced that about \$2,000,000 will be expended for additional equipment and improvements at the Willys-Morrow factory. He also stated that at least 2000 men would be employed regularly at the factory, sister-plant of the Willys-Overland Toledo factory.

Mr. Willys declared that the capacity and efficiency of the local factory must be increased so as to make possible greater output of Overlands and Willys-Knights. He added that the present quarter will see a new production record for his company. It was his opinion that business conditions are very favorable for the automobile industry and that his company will have the best year in its history.

Mr. Willys was the guest at a dinner given in his honor by the Willys-Morrow Co., Southern Tier Motor Co., and officials from other of the city's industries and business places. He complimented C. E. Killinger, head of the Willys-Morrow plant, and other local officials on the success of a system installed by Mr. Killinger, which enables the foreman of the factory to form a board of control which works in conjunction with the management to eliminate waste and promote efficiency.

The Elmira factory is now turning out many parts for Overland and Willys-Knight cars daily.

Willys at 1000 Daily; is Expanding Facilities

TOLEDO, April 22—Production on all four lines built by the Willys-Overland Co. is now at the rate of 1000 daily according to factory report, and facilities are being added to increase this to 1500. Production on the Willys-Knight 6-70 has now reached a quantity basis. Heavy advance orders from dealers are reported.

Mack Opens on Coast

SAN FRANCISCO, April 20—A direct factory branch for the distribution of Mack trucks and buses is to be established immediately in Sacramento, according to announcement by the Mack-International Motor Truck Corp. officers here. A building has been leased in Sacramento and W. V. Morgan, who has been in the San Francisco sales department for some years, has been appointed manager of the new factory branch. A. T. Smith is sales manager for northern California.

Men of the Industry and What They Are Doing

Lindmark Describes Use of Alcohol Fuel Abroad

Gunnar Lindmark, general manager, Scania Vabis, Stockholm, Sweden, who has been studying the industry in America for several weeks, returned to Stockholm Saturday.

His company has been manufacturing motor trucks for upwards of twenty years. Because of gasoline selling at 40 cents a gallon, a number of business houses in Sweden use industrial alcohol for fuel, the engine being made with a compression ratio of 8.3 to 1 as compared with 5 to 1 ratio used for gasoline. There are a few trucks operating on producer gas.

Developments are being made in Sweden with the Diesel engine and Mr. Lindmark expects this type of engine to take its place in the truck field. In Sweden the motor bus has made very definite progress and in the far northern part of Scandinavia, such as Lapland, motor buses are fitted with runners or skis for the front wheels, and with a rubber belt creeper device in conjunction with rear wheels, enabling the vehicle to travel over snow and ice.

Dumser With Kerney & Tucker

George L. Erwin, Jr., sales manager, announces that Leo A. Dumser has joined Kerney & Tucker Corp. as sales engineer. Mr. Dumser was formerly the Wisconsin representative of the Barber-Colman Co., and sales engineer, specializing in cutting tools for the Western Iron Stores Co. of Milwaukee.

Alger Off for Europe

Frederick Alger, a director of the Packard Motor Car Co., sailing on the Olympic, said that Packard business was breaking all records both from a sales and earnings standpoint. He added that the company had more orders on hand than could be filled conveniently.

Cool With Simoniz

Barry Cool is now associated with the Simoniz Co., Chicago, as vice-president in charge of sales. In the past Mr. Cool has been with jobbing houses in Texas.

Dodge Gains Again

DETROIT, April 21—Retail sales of Dodge Brothers cars and trucks in the United States for the week ended April 17 were 9435, a 47 per cent gain over the same week in 1925. Total retail sales from January 2 to April 17 show a gain of 37 per cent over the period last year.

In calling attention to those figures as actual retail sales the company points out that factory shipments to dealers for the week were 8150, or 1285 under retail deliveries. Shipments for the week showed a 57 per cent gain over the same week last year and total shipments for the year to April 17 were 97,660, a gain of 49 per cent.

WILMER'S GOODYEAR POST TO BE VACANT

Although E. G. Wilmer will resign soon as chairman of the board of the Goodyear Tire & Rubber Co., he will continue to participate in the management of Goodyear as a director of the company, according to President P. W. Litchfield.

A successor to Wilmer as chairman of the Goodyear board is not likely to be named, Litchfield said.

Walton Advanced by James

T. R. Walton, sales manager of the James Motor Valve Co., Detroit, has been elected secretary and treasurer of the company, succeeding H. Temple Barber, former secretary, and W. F. Haas, former treasurer, both of whom have been reelected directors. Other officers reelected are J. H. James, president; and H. E. Butcher, vice-president; the latter also being vice-president of the Champion Spark Plug Co.

Campbell With Standard

Theodore Campbell, for the past two years with the William & Harvey Rowland Co., Inc., is taking up the duties of sales manager for the Standard Welding & Spring Co. of Jersey City.

Madson Joins Acklin

C. G. Madson has been appointed superintendent of the Acklin Stamping Co., Toledo. He was formerly associated with the Studebaker, Chrysler and Briggs companies.

Wayne Officials Change

Changes in the executives of the Wayne Tank & Pump Co., of Canada, Ltd., were accompanied by the transfer of two important executives from American branches to the Canadian office. H. E. Smith comes from Fort Wayne, Ind., to assume the position of secretary-treasurer of the Canadian company, and W. K. Kennedy has been transferred from the Pittsburgh office to take charge of sales.

Hupp Income Gains

DETROIT, April 21—Hupp Motor Car Corp., for the first quarter of 1926 reports net sales \$14,437,693, against \$12,400,468, in the corresponding period last year, and net income \$1,122,307 against \$852,963, equal respectively to \$1.23 and 93 cents on 913,809 shares of \$10 par value capital stock.

As of March 31, 1926, current assets, including cash \$4,044,366, totaled \$15,034,693, against \$11,035,621 a year ago, and current liabilities were \$4,372,178, against \$3,068,517 on the same date last year.

Letts Predicts Approach to European Car Design

The American automobile industry, according to Sir William Letts, president of the Society of Motor Manufacturers and Traders of England and director of the John N. Willys organization in England, has allowed European engineers to run away from it in car efficiency and new body and mechanical design. He added, in a statement issued by the Willys-Overland Co.:

"Consciousness of this has been growing among the most farsighted in the industry, and I know that plans are being developed to correct the deficiency."

He looks for a new type of motor, embodying the best features of American and foreign cars.

Heads California Goodyear

John W. Mapel, former assistant to the president and treasurer of the Goodyear Tire and Rubber Co., of California, was recently elevated to the presidency of this firm by the board of directors. A. F. Osterloh was reelected as vice-president and general manager, as was Walter I. Lyon, secretary of the company. J. S. Willaman was elected treasurer.

F. K. Espenhain, first vice-president of the Goodyear Tire and Rubber Co. of Akron, and J. S. Williams, credit manager of the local company, were elected to the board of directors.

A. F. Dense Appointed

Arthur F. Dense has been appointed factory superintendent of the Locomotive Manufacturing Co. to succeed John R. Walton, resigned.

Samuel Ryder Resigns

Samuel Ryder has resigned as Canadian manager of the Moto Meter Co. of Canada, Hamilton, Ont., and has returned to the United States. Henry Ervin succeeds Mr. Ryder. Mr. Ervin was formerly sales manager of the Canadian Raybestos Co.

Buick Outselling Production

DETROIT, April 19—The Buick Motor Co. announces retail deliveries in the first ten days of April of 9639 cars, 1594 more cars than were shipped from the factory during the same ten days. Coincident with this announcement comes a statement from the Buick sales department that dealers' stocks are the lowest they have been in years at this season.

C. G. Votes Extra Dividend

DETROIT, April 21—The C. G. Spring & Bumper Co. has declared an extra dividend of 5 cents a share, payable with the regular quarterly dividend of 10 cents, May 15.

Report Big Business in Parts Shipments

M. & A. M. A. Finds Good In- creases Also in Equipment and Accessories

NEW YORK, April 20—Automotive parts and accessory shipments, which in February showed a distinct gain over January, continued to climb in March and all indications point to a further increase in April.

All divisions reporting to the Motor and Accessory Manufacturers Association showed a March shipment index figure of 178 compared with 154 in February and 132 in January and with January, 1925, business as a base index of 100.

Service equipment shipments reached a monthly record at 205 against 139 in February and 138 in January.

Original equipment at 182 compared with 160 and 137. The March index also compared with a car and truck production index of 186.

Replacement parts shipments in March were 146 against 114 in February and 103 in January, and the accessory index was 167 against 139 and 127.

Some members of the association expect that original equipment business in April may be affected by curtailment in car and truck production. They have noted Hudson's daily schedule reduction yesterday from 1250 to 900 cars and believe that other companies may be planning to curtail output. But they expect that total April shipments to the trade will exceed March.

Commerce Chamber Will Discuss Automotive Topics

WASHINGTON, April 22—Three major problems of the automotive industry will be considered at the fourteenth annual meeting of the Chamber of Commerce of the United States, meeting here May 11, 12 and 13, according to tentative program announced this week.

These include a proposal, outlined by the National Automobile Chamber of Commerce, that the U. S. Chamber endorse a declaration in favor of international conferences for highway development, as an essential step in the improvement of the world's living conditions; a proposal for uniform traffic regulations for all cities, and a third proposal that motor trucks operating as common carriers should be placed under the supervision of the Interstate Commerce Commission.

Ford to Build Bodies at Australian Factory

DETROIT, April 21—Body-building operations will be started in the Australian subsidiary of the Ford Motor Co. of Canada, Ltd., within the next 30 days, at which time the company will be prepared to place on the Australian market a car of the type now being built at

TOLEDO PAYROLLS REACH YEAR'S HIGH

TOLEDO, April 19—Employment in Toledo automotive plants has reached a new high peak this year according to announcements of the Merchants' & Manufacturers' association showing 1161 employees added to payrolls of 51 plants here last week.

The total in these plants is now 29,563 as compared with 28,213 at the same time a year ago.

Ford City, for various foreign markets.

Assembly plants have been in operation for some time but the bodies have been purchased in the Australian market and are not the regulation Ford type. With the introduction of the new bodies, W. R. Campbell, vice-president and treasurer of Ford of Canada, says Australian business should show a large increase.

New Dodge Roadster

Is Sport Model With Special Trim, Listing at \$880

DETROIT, April 19—Dodge Brothers, Inc., has added a two-passenger sport roadster listing at \$880. This model differs from the standard and special roadsters only in color, upholstery, top and nickel trim.

Both body and hood are finished in pheasant green relieved with partridge striping with the remainder of the car in baked enamel. The upholstery is gray Spanish, hand-buffed leather which contrasts with the tan-colored folding top, the latter having natural finish wood bows with nickel trim. The radiator shell, rims of the bullet headlights and cowl lights also are nickel finished.

Accessory equipment includes automatic windshield wiper, rear view mirror, front and rear bumpers, step plates and cowl ventilator. Natural wood wheels are standard but disk wheels may be had at no extra cost.

Cooper Sales Increase \$1,597,107 During 1925

CINCINNATI, April 12.—The Cooper Corp., manufacturers of Cooper tires and batteries, with factories at Findlay and Madisonville, Ohio, showed a gain of \$1,597,107.26 in total sales during 1925 over the preceding year and a net profit of \$407,081. I. J. Cooper, president, said this was the company's best year and showed a steady progress which would be almost certain to be reflected in further gains during 1926.

The consolidated balance sheet as of Dec. 31, 1925, shows total assets of \$3,338,545; current assets totaling \$2,382,840, of which \$990,471 was in cash, \$1,006,129 in receivables and \$1,335,654 inventory. Current liabilities totaled \$937,978.

Briggs Reports Gain in Net for Quarter

Stockholders Told of New Con- tracts and Progress of Expansion

DETROIT, April 21—Net profit of Briggs Manufacturing Co. for the first quarter this year was \$2,947,342 as against \$2,388,061 for the same period last year according to a report to stockholders at the annual meeting held this week. All directors were reelected as follows: W. O. Briggs, M. L. Briggs, J. H. French, W. F. Connolly and H. C. Maise.

A report to stockholders by J. H. French, first vice-president, outlined the expansion of the company during the year and told of important new contracts signed by large car manufacturers. Several others were pending, he said.

Mr. French said that net profit has averaged about \$1,000,000 monthly since the acquisition of new plant facilities about six months ago. The company has \$8,895,800 cash with no funded debt, preferred stock or bank loans. Profits in the current quarter are expected to show the same rate of increase over last year as did the first quarter.

Tire Dealers' Stocks Show Minor Increase

WASHINGTON, April 22—The Rubber Division of the Bureau of Foreign & Domestic Commerce reports that as of April 1, 1926, 26,675 tire dealers had 1,680,318 casings, including balloons, in stock, or an average of 63 per dealer. This compares with the April 1, 1925, report of 32,592 dealers for a total of 2,026,356, an average of 62.2. Balloon casings totaled 326,147 by 15,117 dealers for a 21.6 average, compared with April 1, 1925, total of 144,433 by 9745 dealers for an average of 14.8.

Inner tube stocks totaled 3,145,220 by 26,639 dealers for a 118.1 average. This compares with the previous April of 3,317,104 by 32,477 dealers for an average of 102.1. Solid and cushion tires numbered 35,281, averaging 24.1 for the 1464 dealers reporting, and comparing with the 47,958 for April of the year previous by 2381 dealers for an average of 20.1.

House Passes Aid Bill

WASHINGTON, April 22—The House passed and sent to the Senate this week the Dowell Federal Aid bill, providing \$165,000,000 for Federal highway construction for the fiscal years of 1927 and 1928. The measure passed the House with practically no opposition. The measure has been sponsored by the National Automobile Chamber of Commerce, the A.A.A., and allied motor and highway associations.

Crude Drop Has No Effect on Tire Prices

Downward Trend Must Continue Further to Bring Cut, Manufacturers Say

AKRON, April 21—The sharp decline in the crude rubber market to new low levels for the year below 50 cents a pound has caused the circulation of reports in Akron that a tire price cut may be made within the next few weeks. While tire manufacturers are reluctant to discuss the price situation, they indicated that no revisions are contemplated at present. Rubber now going into the manufacture of tires was purchased at substantially higher prices, it is pointed out, and to make a reduction at this time would result in serious loss to the industry. If the rubber market continues its downward trend, authorities agree, however, that motorists eventually will benefit by lower tire prices. Rubber is now selling only a few cents above prices quoted at this time last year, shortly before the first of a series of tire price advances was announced.

Factors contributing to the decline in the rubber market have been increased production on the part of growers, larger shipments to this country, and smaller consumption than was anticipated.

Bad weather throughout the country in the past few weeks has slowed up retail tire sales, and spring business has been below that of last year and of several seasons past. Conditions have improved recently, although sales are still not up to earlier expectations.

The reported agreement among British and Dutch rubber growers not to sell further output until a better market existed appears to have failed to achieve its purpose. Akron interests are understood to have purchased recently large quantities of rubber in Singapore at comparatively cheap prices.

Tire production in the Akron district continues around 120,000 casings a day, compared with about 140,000 at this time last year.

Enter Front-Drive Car

INDIANAPOLIS, April 20—A front drive car has been entered in the international sweepstakes by the Hamlin Motor Co., Chicago, which has been experimenting with a car of this type for the past six years. The engine will be a four-cylinder Fronty-Ford of 91.1 cu. in. piston displacement with supercharger of blower type operating at 1½ times the engine speed. The differential and transmission gears are placed at right angles to the frame directly in front of the engine. The weight of the front section is carried on a separate axle. There is a universal joint at each front wheel and one on each side of the driving mechanism. The wheelbase is 102 inches.

ADVOCATE BUS BILL AS EMERGENCY MEASURE

WASHINGTON, April 22—Confidently predicting that the Cummins bill for the regulation of bus and truck operation will not pass Congress at this session, Senator Reed of Pennsylvania this week pressed for enactment of a bill drawn up by him which would vest in state utilities bodies the power to regulate interstate commerce by motor buses operating as common carriers for hire through the interstate tunnel now being constructed under the Hudson River between New York and Jersey City and over the Interstate Bridge being constructed across the Delaware River between Philadelphia and Camden, N. J.

Testifying for his bill before the Senate Committee on Interstate Commerce, Senator Reed characterized it as "emergency legislation."

Declaring that if such regulatory legislation is not enacted and in effect when these traffic arteries are opened on July 1 the conditions would be "chaotic," representatives of motor bus organizations involved advocated the passage of the measure.

New England Section Discusses Tire Features

BOSTON, April 21—Tires and comfort were the subjects presented and discussed at the April meeting of the New England Section of the Society of Automotive Engineers this evening. Professor E. H. Lockwood, of Yale, was first introduced by Chairman M. R. Wolfard. The speaker is associate professor of mechanical engineering at the Sheffield Scientific School at Yale, and is widely known in motor circles through his work on the chassis dynamometer and the Lockwood riding comfort indicator. He gave a very interesting talk on "Measurement and Slip of Pneumatic and Solid Rubber Tires."

Professor Edward P. Warner, in charge of the department of aeronautics at Massachusetts Institute of Technology who is vice-chairman of the S. A. E. section here, was the other speaker. He gave an address on "Riding Comfort."

Discuss Oil Filters

LOS ANGELES, April 17—Oil filtering devices came in for analysis at the April meeting of the Southern California section, Society of Automotive Engineers, which was well attended. W. W. MacDonald, of San Francisco, a prominent member of the Northern California section, led the discussion. He declared that the use of proper oil filters prolongs the life of the wearing parts of the engine, gave a description of various devices on the market and presented figures showing the amount of wear with or without filters.

Show Inventory Gain for Tires and Tubes

Excess of Output Over Shipments Revealed by Rubber Association Report

NEW YORK, April 22—Tire and tube inventories increased further during the month of February according to the monthly bulletin of The Rubber Association of America, Inc., which has just been issued. Production remained in excess of shipments but both showed a slight increase over January figures.

Production of high pressure inner tubes for February was 3,316,739 against 3,537,722 in January and 3,977,721 in February, 1925. Shipments for the three periods were respectively 1,568,305 against 1,706,680 and 2,989,606.

Balloon tire inner tubes production in February was 1,801,922 against 1,569,248 in January. Shipments were 1,233,663 compared with 1,085,352 in January.

Casing Output Higher

Production of high pressure cord pneumatic casings was 1,796,189 in February against 1,621,383 in January and 1,996,488 in February, 1925. Corresponding shipments figures were respectively 1,187,990 against 1,045,302 and 1,458,136.

Balloon casing production in February totaled 1,598,246 against 1,416,409 in January, while shipments for the same periods were 1,285,999 and 1,000,490.

Fabric pneumatic casings fell to a new low level of production in February with a total of only 254,537, compared with 402,784 in January and 944,168 in February, 1925. The corresponding figures for shipments were 103,127 casings against 184,951 and 718,626.

Shipments in solid and cushion tires went down to a new low level of 29,629 compared with 34,361 in January and 55,646 in February, 1925. Production was 59,318 compared with 57,928 in January and 53,058 in February, 1925.

Many Carbon Brush Sizes Lead to Simplification

WASHINGTON, April 22—Finding that the automotive field alone was carrying more than 2000 sizes of carbon brushes, representatives of carbon brush manufacturers and other electrical brush manufacturers, meeting with government experts and private consuming interests here, have decided upon a reduction of the number of varieties and sizes of carbon commutator brushes and brush shunts for electrical equipment.

A simplified practice program decided upon was developed by the Electric Power Club and presented by S. N. Clarkson of Cleveland. E. W. Ely of the division of simplified practice, Department of Commerce, presided.

The simplification plan becomes effective November 1 for one year. It is stated further reduction may be developed later.

A.M.A. Hears Talk on Selling Methods

"Approach" is Stressed and
Manager is Told He Must
Sell Himself

CHICAGO, April 17—"Eighty per cent of sales are made or lost in the first five minutes of interview with prospects," according to Frank S. McLaughlin, director of sales of the Salemanship Foundation, Inc. who addressed a meeting of the Automotive Manufacturers Association at the City Club, Chicago, last night.

Mr. McLaughlin, who spoke on the subject "Executive Control of Sales," asserted that his statement was founded on the findings of research. He cautioned sales executives to stress the importance of "approach" in the training of selling forces. "Approach," he said, must be intelligent and planned, devoid of timidity and conveying an assertive argument of service and profit to the prospective buyer rather than consisting of "information" that does not sell.

Tells of Shortcomings

One chronic weakness noted in sales executives by Mr. McLaughlin is inability to sell themselves to the salesmen. Too much technicality, an inclination to shoot over the heads of others, is a chronic weakness he has found in executives and salesmen, alike. Mr. McLaughlin's organization makes special study of selling methods.

F. B. Caswell, vice-president and director of sales of the Champion Spark Plug Co. contributed an interesting explanation of the status and merits of the Capper-Kelly bill, now pending in Congress, which would give competitive makers of trade-marked products legalized control of their own prices. He argued that the present price maintenance measure would be of great benefit not only to the maker, but to the wholesaler, retailer and final consumer. The consumer would benefit, for one thing, through a new condition minimizing the cut-price sale of damaged or inferior products under false representations that such products are in good condition. The dealer would benefit through a reduction of the cut-price evil and the stabilization of his business. Mr. Caswell made an appeal for a rally to the support of this bill by the industry and trade.

New Sedan for Peerless

CLEVELAND, April 19—Peerless Motor Car Co. has announced the addition of a four-door deluxe sedan listing at \$1795 to the 116-in. wheelbase, 6-80, 6-cylinder line. This model is similar in construction with the standard 5-passenger sedan except for the deluxe finish which includes walnut panels on the doors, the instrument board also being finished in walnut, mohair velvet upholstery, arm rests for the rear seats

and special hardware. Exterior finish is entirely in lacquer, the models produced at the present time being finished in Ohio blue. In addition to the equipment furnished with the other closed models of the Peerless 6-80 line, the deluxe sedan also comes equipped with front bumpers, rear bumperettes and winter front.

Cadillac Lifts Rate of Production Again

DETROIT, April 21—As the result of another increase in its production schedule—the fourth since the introduction of its new car in July, 1925—the Cadillac Motor Car Co. output is 58 per cent in excess of the originally anticipated first year's production of the model.

According to Lynn McNaughton, vice-president, distributors in every part of the country have asked for and received increases in quotas ranging from 10 to 100 per cent.

March shipments, which were 14 per cent above the original schedule, set a new monthly high for the company. Distributors' and dealers' stocks, it is reported, are tending to the subnormal.

Hudson and Essex Front Seats Adjustable Type

DETROIT, April 20—A new seating arrangement for the front passengers in the Hudson and Essex coaches and Hudson brougham is announced by the Hudson Motor Car Co. The front seats in all these cars are now of the individual type and have been developed to provide greatest comfort for passengers.

Both the seat cushion and back of the front individual seats can be adjusted and dealers at time of selling cars urge each purchaser to experiment with adjustment to find which driving position is most comfortable.

Zenith Buys West Allis

MILWAUKEE, April 19—The Zenith Foundry Co. has acquired the entire ownership of the West Allis Iron Works and is taking immediate possession. The plant is equipped to produce gray iron and semi-steel castings from the smallest to 6 tons. The output will be distributed principally in the Milwaukee industrial area, and several large standing orders have been booked by the new owners from manufacturers of automotive units, parts and equipment. Edward C. Freeman, formerly vice-president and works manager of the Wisconsin Grey Iron Foundry Co., Milwaukee, will be general manager.

Hinson Expands Plant

WATERLOO, IOWA, April 17—The Hinson Mfg. Co., makers of tire covers and other automobile fabric specialties, will soon occupy a new factory, giving a floor space increase of nearly 50 per cent, necessary to handle growing business. Clyde Hinson is president.

Financial Notes

Gotfredson Corp., Ltd., reports earnings of \$2.45 a share on the 100,000 shares of no par outstanding in the year ended Dec. 31, 1925. Sales for the year were \$2,558,101, compared with \$2,588,514 in 1924. Total income was \$353,950, which after deduction for depreciation, taxes, etc., brought profits available for distribution to \$245,280. Working capital was \$1,599,975 compared with \$1,548,413 at the end of 1924. Current assets of \$2,570,143 compared with \$1,727,130, and current liabilities were \$970,168 as against \$178,726.

Jordan Motor Car Co. for the quarter ended Mar. 31 reports net profit \$146,381 after depreciation and other charges but before Federal taxes, and comparing with \$205,138 before depreciation and taxes, in the first quarter last year, and equivalent to \$1.03 per share on 126,000 outstanding no par shares. First quarter sales this year were \$4,629,100 compared with \$2,422,256 in the 1925 quarter.

Dunlop Rubber Co., Ltd., reports net profit in 1925 of £2,746,229 which compares with £1,500,151 in 1924. Adding £525,151 carried forward from 1924 left £3,271,380 available for dividends and reserves. After appropriating to general reserve £1,294,767, to dividends on the preference stock £375,000, and to 15 per cent dividend on the ordinary shares £1,008,522, surplus carried forward was £593,090.

American Chain Co., Inc., for 1925, reports net income \$2,401,376, equal to \$4 a share on the combined 350,000, \$25 shares, 8 per cent Class A stock, and 250,000 no par common. Net income for 1924 was \$1,753,765 or \$2.92 a share. Surplus increased from \$553,765 to \$1,201,376. On Dec. 31, 1925, current assets were \$13,985,684 and current liabilities \$2,069,240.

Durant Motors of Canada, Ltd. income account for year ended Dec. 31, 1925, shows net loss of \$20,884, against net loss of \$78,250 in 1924. Balance sheet as of Dec. 31 shows cash \$279,071 against \$303,277; total current assets \$1,405,153 against \$1,600,755, and current liabilities \$323,903 against \$421,724.

Gabriel Snubber Manufacturing Co. reports for the first quarter of 1925 net income of \$257,517, equal to \$1.23 per share on the 200,000 combined class A and class B common no par.

Reo Motor Car Co. for the six months ended February 28 reports net profit \$1,859,408, equal to 92 cents a share on the 2,000,000 shares of \$10 par stock.

Keystone Tire & Rubber Co. for 1925 reports net loss of \$87,030 against net loss of \$277,853 in 1924.

Luther Grinder Expands

MILWAUKEE, April 19—The Luther Grinder Mfg Co., manufacturer of tool grinders and similar specialties, has been obliged to provide more production space and contracts have been let for the erection of a two-story shop addition. Several new lines are being added, including tools for the automotive kit.

Sheet Prices Shaded in Rush for Orders

With U. S. Steel Orders Lower,
Competition is Keen in
All Quarters

NEW YORK, April 22—Judge Gary's statement at Monday's meeting of the U. S. Steel Corporation's stockholders that orders are now coming in at the rate of about 28,500 tons a day against 35,361 tons a month ago—a decline of 20 per cent—makes authoritative what until now has been a surmise. Competition, keen before, has become all the more spirited because of this pronouncement and the general tenor of Judge Gary's remarks regarding the immediate outlook in the steel market.

So far there has been no slashing of prices, but there has been considerably more shading than was the case a fortnight ago. Full-finished automobile sheets, for many weeks the strongest item on the list, are reported to have given way to the extent of \$2 a ton in the Detroit market. Concessions to tonnage buyers of black sheets are rather the rule than the exception. Cold-rolled strip steel has turned easier while the hot-rolled raw material remains fairly steady.

Aside from the general tone of the steel market, the full-finished automobile and cold-rolled strip steel situation is influenced by prospects that the latter will more and more compete with the former for body stock, dropping of extras on wide cold-rolled strips having had a direct effect on the full-finished sheet market. Automotive orders for alloy steel bars are of a routine character, and, on the whole, prices are well maintained. Steel plates are a shade easier. Fresh demand for screw stock is light.

Pig Iron—The lower prices that have been chalked up in the market for foundry irons have attracted quite a few of the smaller automotive foundries, but so far there has been a dearth of contracts for representative tonnages.

Aluminum—Receipts of foreign aluminum, especially from the United Kingdom, have been running relatively heavy in the last few days. Prices remain entirely unchanged. Importers, voicing the sentiments of European producers, have no desire to cut under the price of the domestic producer, and the latter is apparently quite contented to permit the foreign producers to market the tonnages at present shipped into the American market. Demand for remelted metal continues strong.

Copper—The red metal seems to have gotten back to the 14-cent level, thus giving support to the prevailing prices for copper and brass products. Automotive demand for the latter is routine.

Tin—London succeeded in raising prices in spite of the untoward effect of the possibility of a walk-out of the British coal miners on commodity markets in general.

Lead—Spot lead is in light supply, and the market as a whole has gained strength.

Zinc—This metal is just about holding its own.

MARCH PRODUCTION IS 449,677 CARS, TRUCKS

WASHINGTON, April 22—The Department of Commerce announces March production of motor vehicles as 398,042 passenger cars and 51,635 trucks, of which 379,769 passenger cars and 47,758 trucks were made in the United States, and 18,273 passenger cars and 3847 trucks were produced in Canada.

The table below is based on figures received from 177 manufacturers for recent months, 70 making passenger cars and 124 making trucks (17 making both passenger cars and trucks). Data for earlier months include 70 additional manufacturers now out of business, while March data for 9 small firms, mostly truck manufacturers, were not received in time for inclusion in this report. Figures on truck production also include fire apparatus, street sweepers and buses.

	1925		
	Cars	Trucks	Total
Jan.	212,921	28,141	241,062
Feb.	252,803	34,410	287,213
March ...	332,154	45,098	377,252
3 mos. ...	797,878	107,649	905,527
April	391,302	47,823	439,125
May	382,714	43,307	426,021
June	364,806	38,056	402,862
July	358,554	41,840	400,394
Aug.	221,831	37,770	259,601
Sept.	272,425	60,374	332,799
Oct.	406,572	45,914	452,486
Nov.	336,358	40,001	376,359
Dec.	285,199	34,373	319,572
Total ...	3,817,639	497,107	4,314,746
	1926		
Jan.	283,263	*32,637	315,900
Feb.	*334,529	*40,816	375,345
March ...	398,042	51,635	449,677
3 mos. ...	1,015,834	125,088	1,140,922

*Revised.

Oakland Parts Sales

Average to Dealers Was \$7.08
Per Car in 1925

PONTIAC, April 22—Based on the number of Oakland cars known to be in operation, parts sales to Oakland dealers averaged only \$7.08 per car in 1925, according to a compilation of service department records of the Oakland Motor Car Co. This figure is the lowest in Oakland history and compares favorably with the estimated average of \$12 per car for the entire industry.

Oakland cars in service totaled 248,658, approximately 20 per cent of them being five years old, according to R. A. Armstrong, director of service. The parts sales included a large volume of accessories.

Tire & Rim Body to Publish a Year Book

Volume Will Contain Matter
Important to Trade—Minch
Elected President

CLEVELAND, April 20—W. B. Minch, of the Jaxon Steel Products Co., Jackson, Mich., was elected president of the Tire & Rim Association of America at the annual meeting held here in the Hollenden Hotel. Mr. Minch succeeds J. D. Anderson, of the Fisk Rubber Co., Chicopee Falls, Mass.

One of the important matters agreed upon at the annual session was the decision to issue a year book annually. The first will be published shortly and copies distributed among the members. The book will contain the association's standards of tires and rims for motor cycles, automobiles, trucks and airplanes. Sections of all rims for pneumatic tires will be fully dimensioned, as will inspection tolerances. It will be an excellent guide for the trade.

Bonnett Again Secretary

C. E. Bonnett, of Cleveland, who has been a factor in the organization's up-building was reelected secretary. B. Darrow, of the Goodyear Tire & Rubber Co., Akron, was elected vice-president; H. W. Kranz, Cleveland Welding Mfg. Co., reelected treasurer; H. W. Day, Cleveland, reelected assistant secretary and Merrell E. Clark, New York, reelected general counsel.

New members of the board are D. H. Fenton, Fisk Rubber Co.; E. O. Fritch, Kelly-Springfield Tire Co.; R. Iredell, General Tire & Rubber Co.

Eaton Acquires Control of United Alloy Steel

CLEVELAND, April 21—C. S. Eaton, of Otis & Co., and his associates took a firmer grip on a large slice of the automobile business when they acquired control of the United Alloy Steel Co., of Canton, Ohio. The deal involved approximately \$6,000,000. As a result of the sale, E. A. Langanbach has retired as chairman of the board of the steel company.

Eaton and his associates also control the Eaton Axle Co., of this city, a large manufacturer of auto axles. The United Alloy is a pioneer in its field and does an annual business of about \$50,000,000.

Body Builders Plan Meeting

NEW YORK, April 21—Topics announced for the convention of the Automobile Body Builders Association at the Hotel Statler, Detroit, June 8, 9 and 10, include present public tastes in body design; merchandising the custom-built body; reducing bus body weight; laws affecting bus body sizes; most desirable painting method from production standpoint; latest body finishing methods, and making sheet metal to suit finishers.

Seek Postal Change to Permit Bus Use

Savings of 200 to 300 Per Cent
Possible on Short Hauls,
Department Shows

WASHINGTON, April 17—Recommendation that the postal laws be changed in order to enable the Department to use motor transports and compel bus lines to contract for the handling of mail was made this week by Joseph Stewart, executive assistant to the Postmaster General, testifying before the Joint Committee on Postal Rates. Figures presented to the committee showed that the Post Office Department could effect large savings if it could employ motor buses in handling short-haul mails. In some instances, the figures showed, the saving to the Department would be from 200 to 300 per cent, by using buses, compared with present railroad rates.

At the present time legislation is pending which would give the Interstate Commerce Commission power to fix rates for bus lines operating in interstate business. If such legislation is enacted, Mr. Stewart declared, the Department undoubtedly would find it advantageous to dispatch mail over motor lines. But until such legislation is passed, regulating interstate bus transportation, the Department cannot compel intrastate carriers to handle mail.

Present indications are that the pending legislation, embodied in the Cummins bill, will not be reported out at the present session of Congress.

New Marmon Speedster at \$3295 is Announced

INDIANAPOLIS, April 19—A new four-passenger open model known as the speedster and listing at \$3295, has been added to the Marmon line.

It is finished in a two-tone combination and the upholstery is hand-buffed leather. There are two tonneau lights with integral switches in the back of the front seat and an indirect light for the instrument boards. The steering wheel is walnut while the instrument panel and garnish moldings on the doors are walnut finish.

Equipment includes fender mirrors, nickel-plated windshield wings, double rear view mirror, top boot and irons, cowl ventilator, combination tail, stop and backing light, cigar lighter and handy lamp. The folding top has natural finish wood bows with nickel-plated slat irons. The car is fairly close-coupled giving ample space between tire carrier and back of body for a trunk.

Chandler Adds Sedan

CLEVELAND, April 19—A Berline seven-passenger Sedan listing at \$2095 has been added by the Chandler Motor Car Co. It is similar to the seven-passenger sedan at \$1995 except that the front seats are in a separate compart-

ment. Two color options are offered on the Berline Sedan as it is finished in either two-tone tan or blue. The upholstery is mohair and equipment furnished with this model at list price includes front bumper, automatic windshield wiper, trunk rack, sun visor, cowl ventilator, rear view mirror, engine heat indicator, dash gasoline gage, cowl lights, smoking set and door and gearset locks.

Ford Airways Demonstrate Air Service Efficiency

DETROIT, April 17—A long step toward demonstrating the safety and reliability of air transportation has been made by Ford Airways in the first year of operation. In the Detroit-Chicago service 649 trips were completed for an efficiency of 97 per cent. On the shorter Detroit-Cleveland service a record of 99 per cent was made for the 457 trips. Total mileage for both routes is 223,026 miles, and over 104,400 lbs. of freight were carried in addition to United States mail. There were no accidents to the planes during the year and no one was injured.

Hupp Adds Coupe

Model at \$1385 is Addition to
Six-Cylinder Line

DETROIT, April 19—A two-passenger coupe listing at \$1385 is the first new body style to be added to the Hupmobile six-cylinder line since its introduction last year. Particular attention has been paid in the body design to adapt it for use either for business or pleasure.

The rumble seat in the rear deck is unusually wide and by having the seat cushions quickly detachable, it is possible to carry a large amount of merchandise or baggage in the rear compartment. A small door on the right side of the body is provided for the carrying of golf clubs and similar articles.

Upholstery is crushed leather with velour optional. The Duco exterior finish is green with gold striping and black upperstructure. In addition to the usual equipment furnished on other Hupp six-cylinder models, the new job has a dash gasoline gage and shock absorbers.

Expand Onyx Factory

DUBUQUE, IOWA, April 17—The Yavapai Onyx Mining Corp., which has a factory here, has obtained the former Goetzinger Wagon Co. factory in Dyersville, a small town adjacent to this city, and will install machinery for the production of its onyx gear shift ball. The local plant is unable to maintain schedules to meet demand for the product which has become standard equipment on many cars. The company was launched here only two years but has established a national market under Joseph A. Kelly, president; James H. Devaney, vice-president; J. W. Walsh, secretary and F. J. Lawlor, director of sales.

Foreign Wholesalers Get A.E.A. Invitation

Eleventh Annual Convention
and Eighth Annual Show
to be Held Nov. 8-13

CHICAGO, April 22—Automotive wholesalers in every foreign country will be invited to the eleventh annual convention and eighth annual show of the Automotive Equipment Association to be held in the Coliseum, Chicago, Nov. 8-13, this year.

As in previous years it is expected that automotive wholesalers from many countries will take advantage of the invitation extended by the A. E. A. and will attend and get the benefits of the most important and latest developments in the automotive industry.

Complete exhibits of leading lines of automobile accessories, supplies, shop and service equipment, machinery and tools will be shown. New inventions, models and items will be announced and displayed for the first time at this show. Many of the modern labor-saving tools and pieces of machinery will be in operation and demonstrations will be made. There will be many things for those persons who are interested in the wholesale distribution of radio, airplanes and other modern inventions.

The exposition is not open to the public, admission being confined to association members, their salesmen, representatives and friends. To all these the A. E. A. extends a cordial invitation to attend.

Kissel Quarter Sales Show 40 Per Cent Gain

HARTFORD, WIS., April 17—A gain of 40 per cent in sales of the Kissel Motor Car Co., during the first quarter of 1926, compared with the same period a year ago, is reported by the factor here. Orders are being received in such volume that the Kissel plant is operating at maximum capacity, and forward bookings are sufficient to keep all facilities fully occupied far into the Summer. The 40 per cent gain is significant in view of the fact that Kissel sales in 1925 were nearly three times those of 1924 and established a new high record. Important extensions of the dealer organization in recent months has contributed materially to the relatively enormous increase so far this year.

Stolper to Build Plant

MILWAUKEE, April 19—All contracts have been let for the erection of a \$50,000 addition to the plant of the Stolper Steel Products Co., formerly the A. B. & B. Sheet Metal Works. The concern makes hoods, fenders, gas tanks and similar sheet metal parts and specialties for the automotive industries and will increase its capacity about 90 per cent by the construction now being rushed to meet the heavy demand.

Franklin Shows Net of \$1,983,103 in 1925

SYRACUSE, April 19—H. H. Franklin Mfg. Co., in its consolidated income account for the year ended Dec. 31, 1925, shows net income of \$1,983,103, which compares with a deficit of \$811,435 in the year previous. Surplus for the year after payment of preferred dividends was \$1,534,274.

Current assets increased in 1925 to \$7,017,340 as compared with \$5,756,174 at the close of 1924. Cash at \$808,074 was a reduction from \$1,468,219; sight drafts increased to \$291,042 from \$164,985; receivables were \$384,192 as against \$366,965, and inventory increased to \$5,534,032 from \$3,756,005. Current liabilities totaled \$984,307 in 1925 as against \$1,280,835 at the close of 1924. Total assets were \$17,877,186 as against \$16,390,778.

Business of the company in the year 1926 to date is reported as more than doubling business for the same period in 1925.

Eaton Returns Officers and Declares Dividend

CLEVELAND, April 19—Declaration of a dividend and reelection of officers marked the annual meeting here of directors of the Eaton Axle & Spring Co.

Those reelected were J. O. Eaton, chairman of the board; C. I. Oaks, president and general manager; F. C. Robie, vice-president in charge of manufacturing; R. E. Enos, vice-president in charge of sales; F. A. Buchba, secretary and treasurer; E. C. Steussy, assistant secretary and treasurer.

The dividend declared, payable May 1 this year, amounts to 53 cents per share.

Coming Feature Issues of Chilton Class Journal Publications

May—Automobile Trade Journal—Biggest Market Issue.

May 6—Motor Age—Sales and Service Reference Number.

Seaman Body Builds New Plant Addition

MILWAUKEE, April 19—Despite the fact that an addition doubling the size of the works of the Seaman Body Corp. was completed only a short time ago, the pressure upon production of bodies for the Nash and Ajax is so heavy that plans have been accepted for another addition, five stories, 100 x 172 ft. Contracts are now being awarded and work will be pushed to early completion. The Seaman plant, originally one of the largest body works in the country, will soon rank as the largest under a single roof. The Nash-Ajax interests own a 50 per cent interest in the property.

Will Service Rollin

CLEVELAND, April 20—For the purpose of servicing the 8500 automobiles which the Rollin Motor Co. sold prior to its liquidation a new corporation, the Rollin Motor Service Co., has been formed with a capital of \$10,000. It is using a part of the Cleveland Tractor Co. plant as its headquarters. Manufacture of replacement parts for Rollin cars has been sublet to the tractor company it has been announced.

New York Sales Run Well Over Last Year

NEW YORK, April 22—Total passenger car sales in the Metropolitan District in March were 12,290 compared with 3364 in February and 6773 in January. March sales exceeded January and February combined by 2153 and were 1823 or 17 per cent more than in March, 1925, according to the monthly new car sales analysis by Sherlock & Arnold.

During the first quarter this year total new car sales of 22,427 exceeded those in the first quarter last year by 5299 or about 30 per cent. Sales of higher priced cars in this year's first quarter gained 32 per cent over the same quarter last year, while sales of medium and low priced cars gained about 30 per cent.

The large March total was attained despite adverse weather conditions. Although the weather continues cold, April sales are unusually strong and the month should show a good increase over the high total for March.

1925 Tractor Tabulation Shows 105.9% Increase

WASHINGTON, April 17—An increase of 105.9 per cent in the number of tractors used on farms in the United States is shown by the 1925 farm census made public here this week. The figures reveal that during last year 7.5 per cent of the farms owned one or more tractors, compared to 3.6 per cent of farms owning tractors in 1920.

In 1925 there were 6,371,617 farms, of which 477,694 reported owning tractors, the aggregate number of tractors being owned by this number of farms being 506,745.

Calendar of Coming Events

SHOWS

- May 25 — International Exhibition of Roads, Transport and Touring. Show Grounds, Argentine Rural Society, Palermo, Buenos Aires.
- June 10-20—Third Annual Automobile, Motor Cycle and Cycle Exposition, Geneva.
- July 28—First Peruvian Automobile Show, under auspices Peruvian Touring Club, Lima.
- Sept. 7-10—6th Annual New Haven Machine Tool Exhibition.
- Sept.—Fifth International Road Congress and Exposition, Milan.
- Sept.—Automobile Show, Prague.
- Oct. 7-17—Auto Salon, Grand Palais, Paris.
- Oct. 21-30—Olympia Show, London.
- Nov. 8-13—Convention and Show, Automotive Equipment Association, Coliseum, Chicago.
- Dec.—Show at Brussels.
- End of 1926—Show at Berlin.

CONVENTIONS

- April 28-30—Thirteenth National Foreign Trade Convention, Charleston, S. C., Francis Marion Hotel.
- April 30—Annual Meeting of the National Highway Traffic Association Automobile Club of America, New York.

May 6-8—National Machine Tool Builders Association, Providence, R. I.

May 10-13 — 14th annual meeting Chamber of Commerce of the United States, Washington.

May 13-15—American Gear Manufacturers Association, Tenth Annual Convention, Book-Cadillac Hotel, Detroit.

May 17-21—National Electric Light Association and Electric Truck Manufacturers Association, Atlantic City, N. J.

May 28-29—National Motor Grinders and Rebuilders Association, Indianapolis.

June 7-12—Annual United States good roads show and convention, direction United States Good Roads Association, Inc., and Bankhead National Highway Association.

June 8-10—Automobile Body Builders Association with manufacturers' exhibit, Detroit, Hotel Statler.

June 14-19 — Automotive Equipment Association, Mount Royal Hotel, Montreal, Canada.

June 16-18—Thirteenth National Convention, Society of Industrial Engineers, Philadelphia, Bellevue-Stratford Hotel.

Oct. 4-8 — 45th Annual Convention, American Electric Railway Association and manufacturers' exhibit, Cleveland Public Auditorium and Annex.

Nov. 15-19—National Standard Parts Association convention and exhibit, Hotel Sherman, Chicago.

RACES

- May 1 — Races at opening of new Speedway, Atlantic City.
- May 10—Charlotte, N. C.
- May 21-22—Tenth Annual Economy Run, Los Angeles to Camp Curry.
- May 30-31 — 500-mile race, Indianapolis.
- June 12 — Flag Day races, Altoona Speedway.
- June 12-13—Rudge-Whitworth 24-hour stock car race, Le Mans, France.
- June 27—French Grand Prix, Miramas Track, Marseilles.
- Sept. 6 — Labor Day races, Altoona Speedway.

S. A. E. MEETINGS National

- June 1-4 — Semi-annual meetings, French Lick Springs, Ind.
- Sept. 21-23 — Production Engineering Meeting, Hotel Sherman, Chicago.